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3. System	4. Document Identifier
DRY TRANSFER FACILITY	110-SYC-SY00-00300-000-00A

5. Title

DRY TRANSFER FACILITY SEISMIC ANALYSIS

6. Group

CIVIL/STRUCTURAL/ARCHITECTURAL

7. Document Status Designation

X Preliminary ☐ Final ☐ Cancelled

8. Notes/Comments

~~QE Review Copy~~ WSE 4/8/04

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1) ECN-001, DATED 08/29/2005

Attachments	Total Number of Pages
1. GTSTRUDL Output using fixed base boundary condition (CD-ROM)	92
2. GTSTRUDL Output using lower bound 35 soil springs (CD-ROM)	103
3. GTSTRUDL Output using median 35 soil springs (CD-ROM)	103
4. GTSTRUDL Output using upper bound 35 soil springs (CD-ROM)	103
5. GTSTRUDL Output using lower bound 110 soil springs (CD-ROM)	103
6. GTSTRUDL Output using median 110 soil springs (CD-ROM)	103
7. GTSTRUDL Output using upper bound 110 soil springs (CD-ROM)	103
8. Dry Transfer Facility Wall Elevations including Beam Stick Model Joints and Elements I.D.	32
9. Dry Transfer Facility General Arrangement	1

9. No.	10. Reason For Revision	11. Total # of Pgs.	12. Last Pg. #	13. Originator (Print/Sign/Date)	14. Checker (Print/Sign/Date)	15. QER (Print/Sign/Date)	16. Approved/Accepted (Print/Sign)	17. Date
00A	Initial Issue	769	Att. 9 - Sht. 1	Scott Earnest 4/5/04	Hsien Ko 4/5/04	William Dockery 7APR 2004	Richard Pernisi	4/7/04

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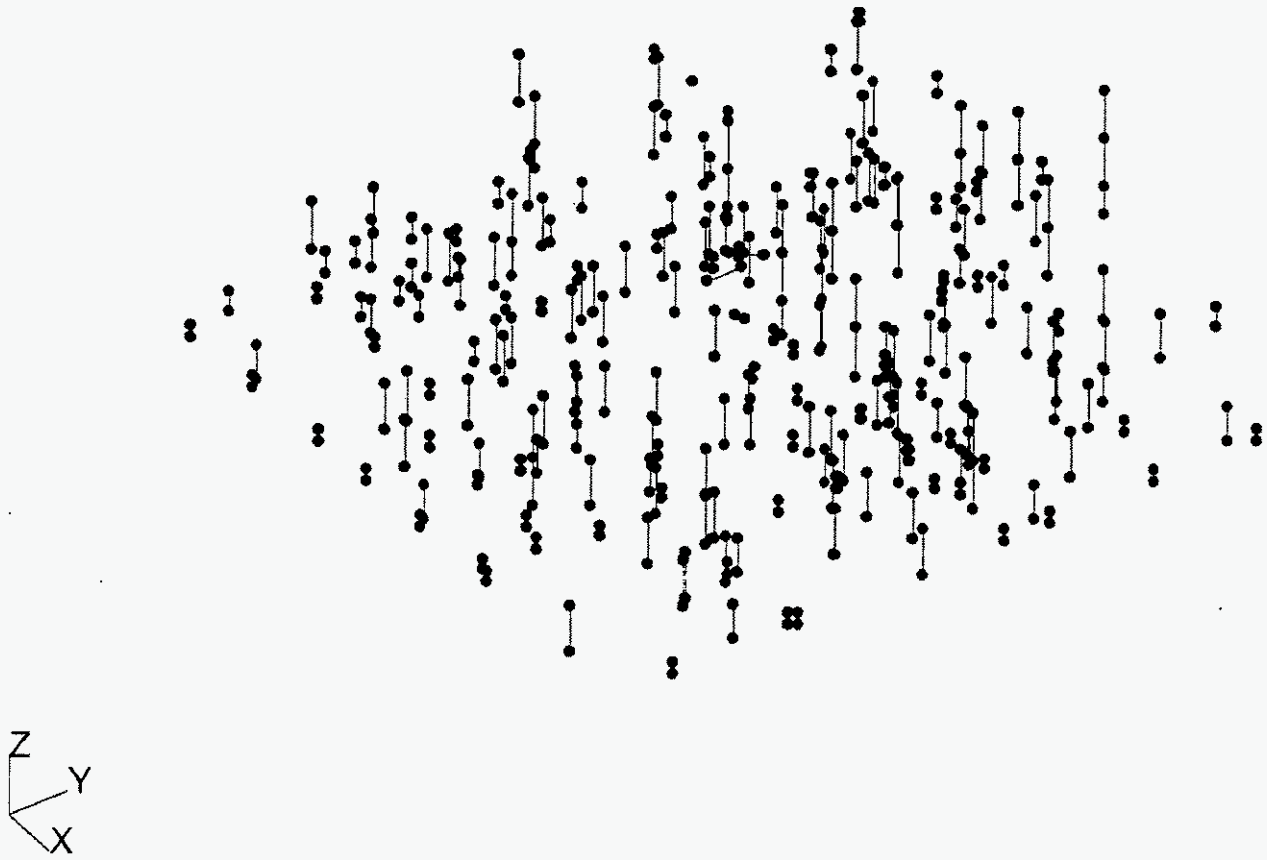
FIGURES

3-D View of DTF Beam Element Stick Model



TABLES

N/A

1. PURPOSE

The purpose of this calculation is to perform a dynamic and static analysis on the Dry Transfer Facility, and to determine the response spectra seismic forces for the design basis ground motions. The resulting seismic forces and accelerations will be used in a subsequent calculation to complete preliminary design of the concrete shear walls, diaphragms, and basemat.

2. METHOD

The Cartesian coordinate origin (0,0,0) for the Dry Transfer Facility is located at the intersection of column lines 1.0 and R.0, at Elevation 0'-0" (Ref. Attachment 9, DTF General Arrangement 110-P1K-WHS0-00102-000-00B). The positive X-axis extends from the origin toward column line 13.0 along column line R.0. The positive Y-axis extends from the origin toward column line A.0 along column line 1.0. The positive Z-axis extends vertically upward from the origin.

A three-dimensional stick model (See Figure on Page 3) was created incorporating the mass and stiffness properties calculated in Design Calculation 110-SYC-SY00-00200-000-00A. The mass for each floor was lumped at a dedicated node located at the coordinates for the center of mass. "Dummy" elements with zero stiffness were used to provide continuity between the center of mass and the center of rigidity at each primary floor level; elevations 0, 32, 66, 100, and 107ft. Rigid solids or "links" were used to simulate a rigid floor diaphragm. The center of rigidity was used as the master node for the rigid links. All other nodes lying on the same floor elevation were slaved to the master node. Attachment 8 shows the wall elevations with the GTSTRUDL beam elements and joints labeled for the Dry Transfer Facility.

A support spring with six degrees of freedom was placed at the center of rigidity (GTSTRUDL node 100) of the basemat. Seven analysis runs were performed using six bounding support spring conditions, as well as one fixed base solution. Three springs were calculated, each at two different soil depths (35 feet and 110 feet), yielding six support spring conditions. The naming convention for the six support spring constants used are; lower bound 35, median 35, upper bound 35 (highest stiffness), lower bound 110 (lowest stiffness), median 110, upper bound 110. These bounding spring constants were computed in Design Calculation 110-CYC-CY00-00100-000-00A using the requirements of ASCE 4-98 for frequency independent soil springs. Reference the preceeding calculation for a complete description of the soil spring methodology. A modal analysis was performed after specifying the boundary conditions. A response spectrum analysis was then performed for each boundary condition using the seismic design spectra determined for the surface facilities area (Ref. DTN: MO0402SDSTMHIS.004, "SEISMIC DESIGN SPECTRA AND TIME HISTORIES FOR THE SURFACE FACILITIES AREA (POINT D/E) AT 5E-4 ANNUAL EXCEEDANCE FREQUENCY," Silva, W.J.). The response spectra accelerations for 20% critical damping were used for the first three modes and 7% critical damping values were used for the remaining modes.

The forces and accelerations will be determined for each of the three global directions; HX, HY, and VZ. HX and HY represent both orthogonal horizontal directions and VZ represents the vertical direction. The modal contributions are combined using the NRC "Ten Percent Method." After combining the global modes, pseudo-static loadings for each global direction are created using the dynamic results. Pseudo-static loads create usable static results computed using the dynamic results. These three independent pseudo-static load cases are then combined using the SRSS method. A stiffness analysis is also performed within GTSTRUDL for the dead load case. The dead load case is the weight (mass) used in determining the seismic forces, which is comprised of the structure's self weight plus 25% of the applied live load.

3. QUALITY ASSURANCE

This calculation is for the Dry Transfer Facility, which is designated as an important to safety structure by the *Q-List*, TDR-MGR-RL-000005 (BSC 2003). Therefore the requirements of the *Quality Assurance Requirements and Description* (DOE 2003) are applicable to this calculation.

4. USE OF SOFTWARE

Microsoft Excel 97 SR-2 was used to build the GTSTRUDL input file. The qualified finite element computer code GTSTRUDL version 26 , which is identified with the Software Tracking Number 10829-26-00, was utilized in this calculation package to perform the dynamic and static analysis on the Dry Transfer Facility.

GTSTRUDL is a commercially available computer code qualified for performing static and dynamic analysis of structural systems, and it is in this capacity that the software is used. GTSTRUDL was not used outside of it's range of qualification. The software is operated on a PC system running the Windows 2000 operating system.

5. INPUTS

"SEISMIC DESIGN SPECTRA AND TIME HISTORIES FOR THE SURFACE FACILITIES AREA (POINT D/E) AT 5E-4 ANNUAL EXCEEDANCE FREQUENCY," Silva, W.J., DTN: MO0402SDSTMHIS.004

Mass and stiffness properties calculated in Design Calculation 110-SYC-SY00-00200-000-00A.

Support spring constants calculated in Design Calculation 110-CYC-CY00-00100-000-00A.

6. ASSUMPTIONS

This calculation is based on the output of Design Calculation 110-SYC-SY00-00200-000-00A. It is assumed that the referenced output is bounding and of sufficient accuracy to be used in this calculation.

7. CALCULATIONS

This section contains the actual GTSTRUDL input file used for running the seven individual boundary condition cases. The output is given in attachments 1 through 7.

```
STRUDL 'DTF 1' 'RESPONSE SPECTRA ANALYSIS USING SOIL SPRINGS'
$
UNITS    FEET     KIPS     DEGREES
$
JOINT COORDINATES
$ Elev. 0
1        0.0      246.0    15.0     $ Wall Column Line 1-1
2        48.0     247.3    15.0     $ Wall Column Line 3-1
3        89.0     281.5    10.0     $ Wall Column Line 3.5-1
4        123.0    193.8    0.0      $ Wall Column Line 4-1
5        123.0    295.5    8.0      $ Wall Column Line 4-2
6        123.0    398.4    0.0      $ Wall Column Line 4-3
7        147.0    38.9     0.0      $ Wall Column Line 5-1
8        147.0    122.1    0.0      $ Wall Column Line 5-2
9        147.0    192.6    0.0      $ Wall Column Line 5-3
10       147.0    243.5    0.0      $ Wall Column Line 5-4
11       147.0    295.0    0.0      $ Wall Column Line 5-5
12       147.0    346.5    0.0      $ Wall Column Line 5-6
13       147.0    442.5    8.0      $ Wall Column Line 5-7
14       171.0    80.6     0.0      $ Wall Column Line 6-1
15       195.0    139.6    0.0      $ Wall Column Line 7-1
16       195.0    237.0    0.0      $ Wall Column Line 7-2
17       195.0    412.0    0.0      $ Wall Column Line 7-3
18       207.0    453.9    0.0      $ Wall Column Line 7.5-1
19       225.0    388.0    8.0      $ Wall Column Line 8.3-1
20       259.0    216.5    8.0      $ Wall Column Line 9-1
21       259.0    386.0    0.0      $ Wall Column Line 9-2
22       295.0    122.1    8.0      $ Wall Column Line 10-1
23       295.0    289.0    8.0      $ Wall Column Line 10-2
24       295.0    386.0    0.0      $ Wall Column Line 10-3
25       277.0    93.1     0.0      $ Wall Column Line 9.5-1
26       344.0    133.5    0.0      $ Wall Column Line 11-1
27       344.0    211.0    8.0      $ Wall Column Line 11-2
28       344.0    289.0    8.0      $ Wall Column Line 11-3
29       344.0    373.0    0.0      $ Wall Column Line 11-4
30       344.0    446.9    0.0      $ Wall Column Line 11-5
31       377.0    216.8    0.0      $ Wall Column Line 12-1
32       377.0    289.0    8.0      $ Wall Column Line 12-2
33       377.0    373.0    0.0      $ Wall Column Line 12-3
34       442.0    78.1     8.0      $ Wall Column Line 13-1
35       442.0    210.8    0.0      $ Wall Column Line 13-2
36       442.0    288.8    8.0      $ Wall Column Line 13-3
37       442.0    425.9    8.0      $ Wall Column Line 13-4
```

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$
38      221.0    492.0    13.0     $ Wall Column Line A-1
39      171.0    466.0    0.0      $ Wall Column Line B-1
40      184.0    414.0    13.0     $ Wall Column Line D-1
41      95.0     402.0    0.0      $ Wall Column Line D.5-1
42      119.9    388.0    0.0      $ Wall Column Line E-1
43      369.1    388.0    8.0      $ Wall Column Line E-2
44      114.3    362.0    0.0      $ Wall Column Line F-1
45      246.6    362.0    0.0      $ Wall Column Line F-2
46      114.3    336.0    0.0      $ Wall Column Line G-1
47      269.5    336.0    0.0      $ Wall Column Line G-2
48      210.0    274.0    8.0      $ Wall Column Line J-5
49      119.9    310.0    0.0      $ Wall Column Line H-1
50      270.6    310.0    0.0      $ Wall Column Line H-2
51      119.9    283.5    0.0      $ Wall Column Line H.75-1
52      305.5    274.0    0.0      $ Wall Column Line J-1
53      388.9    274.0    8.0      $ Wall Column Line J-2
54      114.3    257.5    0.0      $ Wall Column Line J.4-1
55      114.3    231.0    0.0      $ Wall Column Line J.9-1
56      305.5    226.0    0.0      $ Wall Column Line K-1
57      339.0    226.0    0.0      $ Wall Column Line K-2
58      409.5    226.0    0.0      $ Wall Column Line K-3
59      119.9    204.5    0.0      $ Wall Column Line K.5-1
60      279.2    204.5    0.0      $ Wall Column Line K.5-2
61      271.0    192.0    0.0      $ Wall Column Line K.8-1
62      72.6     180.0    8.0      $ Wall Column Line L-1
63      396.6    180.0    0.0      $ Wall Column Line L-2
65      205.0    154.0    0.0      $ Wall Column Line M-1
66      305.5    154.0    0.0      $ Wall Column Line M-2
68      56.9     119.0    15.0     $ Wall Column Line N-1
69      225.5    119.0    0.0      $ Wall Column Line N-2
70      305.5    119.0    0.0      $ Wall Column Line N-3
71      388.9    119.0    8.0      $ Wall Column Line N-4
72      73.6     80.0     8.0      $ Wall Column Line O-1
73      242.4    80.0     8.0      $ Wall Column Line O-2
74      388.9    80.0     0.0      $ Wall Column Line O-3
75      227.1    50.0     8.0      $ Wall Column Line P-1
76      73.6     0.0      8.0      $ Wall Column Line R-1
77      242.5    0.0      8.0      $ Wall Column Line R-2
78      388.9    0.0      0.0      $ Wall Column Line R-3
79      135.0    136.5    0.0      $ Wall Column Line 4.5-1
80      147.0    397.8    0.0      $ Wall Column Line 5-9
81      225.0    290.0    0.0      $ Wall Column Line 8.3-4
82      410.6    336.0    0.0      $ Wall Column Line G-3
83      344.0    86.8     0.0      $ Wall Column Line 11-8
84      384.0    85.3     0.0      $ Wall Column Line 12.1-1
85      384.0    113.8    0.0      $ Wall Column Line 12.1-2
86      -17.8    145.0    0.0      $ Wall Column Line M.3-1
87      69.9     145.0    0.0      $ Wall Column Line M.3-2
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1001    0.0      99.0     0.0      $ Wall Column Line 1-b
1002    0.0      160.1    0.0      $ Wall Column Line 1-c
1003    0.0      220.6    0.0      $ Wall Column Line 1-d
1004    0.0      339.0    0.0      $ Wall Column Line 1-e
1005    0.0      454.4    0.0      $ Wall Column Line 1-f
1006    48.0     90.9     0.0      $ Wall Column Line 3-a
1007    48.0     117.9    0.0      $ Wall Column Line 3-b
1008    48.0     160.1    0.0      $ Wall Column Line 3-c
1009    48.0     223.9    0.0      $ Wall Column Line 3-d
1010    48.0     336.8    0.0      $ Wall Column Line 3-e
1011    89.0     164.5    0.0      $ Wall Column Line 3.5-a
1012    89.0     214.6    0.0      $ Wall Column Line 3.5-b
1013    89.0     271.4    0.0      $ Wall Column Line 3.5-c
1014    89.0     319.8    0.0      $ Wall Column Line 3.5-d
1015    89.0     378.0    0.0      $ Wall Column Line 3.5-e
1016    123.0    286.0    0.0      $ Wall Column Line 4-a
1017    123.0    305.0    0.0      $ Wall Column Line 4-b
1018    147.0    425.5    0.0      $ Wall Column Line 5-a
1019    147.0    454.0    0.0      $ Wall Column Line 5-b
1020    225.0    374.8    0.0      $ Wall Column Line 8.3-a
1021    225.0    401.0    0.0      $ Wall Column Line 8.3-b
1022    259.0    153.5    0.0      $ Wall Column Line 9-a
1023    259.0    250.5    0.0      $ Wall Column Line 9-b
1024    259.0    312.0    0.0      $ Wall Column Line 9-c
1025    295.0    5.1      0.0      $ Wall Column Line 10-a
1026    295.0    42.3     0.0      $ Wall Column Line 10-b
1027    295.0    130.5    0.0      $ Wall Column Line 10-c
1028    295.0    223.0    0.0      $ Wall Column Line 10-d
1029    295.0    269.8    0.0      $ Wall Column Line 10-e
1030    295.0    291.8    0.0      $ Wall Column Line 10-f
1031    295.0    312.0    0.0      $ Wall Column Line 10-g
1032    344.0    177.8    0.0      $ Wall Column Line 11-a
1033    344.0    218.8    0.0      $ Wall Column Line 11-b
1034    344.0    268.8    0.0      $ Wall Column Line 11-c
1035    344.0    298.3    0.0      $ Wall Column Line 11-d
```

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1037     377.0    300.0    0.0      $ Wall Column Line 12-b
1038     442.0    37.0     0.0      $ Wall Column Line 13-a
1039     442.0    123.3    0.0      $ Wall Column Line 13-b
1040     442.0    268.5    0.0      $ Wall Column Line 13-c
1041     442.0    300.0    0.0      $ Wall Column Line 13-d
1042     442.0    373.0    0.0      $ Wall Column Line 13-e
1043     442.0    446.9    0.0      $ Wall Column Line 13-f
$
1044     53.4     492.0    0.0      $ Wall Column Line A-a
1045     157.6    492.0    0.0      $ Wall Column Line A-b
1046     334.9    492.0    0.0      $ Wall Column Line A-c
1047     111.0    414.0    0.0      $ Wall Column Line D-a
1048     231.5    414.0    0.0      $ Wall Column Line D-b
1049     288.0    414.0    0.0      $ Wall Column Line D-c
1050     319.3    388.0    0.0      $ Wall Column Line E-a
1051     392.0    388.0    0.0      $ Wall Column Line E-b
1052     201.5    274.0    0.0      $ Wall Column Line J-a
1053     220.5    274.0    0.0      $ Wall Column Line J-b
1054     335.0    274.0    0.0      $ Wall Column Line J-c
1055     388.6    274.0    0.0      $ Wall Column Line J-d
1056     17.1     180.0    0.0      $ Wall Column Line L-a
1057     103.5    180.0    0.0      $ Wall Column Line L-b
1058     1.1      119.0    0.0      $ Wall Column Line N-a
1059     66.6     119.0    0.0      $ Wall Column Line N-b
1060     121.9    119.0    0.0      $ Wall Column Line N-c
1061     378.0    119.0    0.0      $ Wall Column Line N-d
1062     438.4    119.0    0.0      $ Wall Column Line N-e
1063     18.4     80.0     0.0      $ Wall Column Line O-a
1064     77.3     80.0     0.0      $ Wall Column Line O-b
1065     134.3    80.0     0.0      $ Wall Column Line O-c
1066     225.9    80.0     0.0      $ Wall Column Line O-d
1067     305.5    80.0     0.0      $ Wall Column Line O-e
1068     176.3    50.0     0.0      $ Wall Column Line P-a
1069     223.8    50.0     0.0      $ Wall Column Line P-b
1070     274.5    50.0     0.0      $ Wall Column Line P-c
1071     7.9      0.0      0.0      $ Wall Column Line R-a
1072     69.1     0.0      0.0      $ Wall Column Line R-b
1073     134.9    0.0      0.0      $ Wall Column Line R-c
1074     183.5    0.0      0.0      $ Wall Column Line R-d
1075     238.5    0.0      0.0      $ Wall Column Line R-e
1076     305.5    0.0      0.0      $ Wall Column Line R-f
$
$ Elev. 8, 10, 13 and 15
$
2000     0.0      31.9     15.0     $ Wall Column Line 1-a
2001     0.0      99.0     15.0     $ Wall Column Line 1-b
2002     0.0      160.1    15.0     $ Wall Column Line 1-c
2003     0.0      220.6    15.0     $ Wall Column Line 1-d
2004     0.0      339.0    15.0     $ Wall Column Line 1-e
2005     0.0      454.4    15.0     $ Wall Column Line 1-f
2006     48.0     90.9     15.0     $ Wall Column Line 3-a
2007     48.0     117.9    15.0     $ Wall Column Line 3-b
2008     48.0     160.1    15.0     $ Wall Column Line 3-c
2009     48.0     223.9    15.0     $ Wall Column Line 3-d
2010     48.0     336.8    15.0     $ Wall Column Line 3-e
2011     89.0     164.5    10.0     $ Wall Column Line 3.5-a
2012     89.0     214.6    10.0     $ Wall Column Line 3.5-b
2013     89.0     271.4    10.0     $ Wall Column Line 3.5-c
2014     89.0     319.8    10.0     $ Wall Column Line 3.5-d
2015     89.0     378.0    10.0     $ Wall Column Line 3.5-e
2016     123.0    286.0    8.0      $ Wall Column Line 4-a
2017     123.0    305.0    8.0      $ Wall Column Line 4-b
2018     147.0    425.5    8.0      $ Wall Column Line 5-a
2019     147.0    454.0    8.0      $ Wall Column Line 5-b
2020     225.0    374.8    8.0      $ Wall Column Line 8.3-a
2021     225.0    401.0    8.0      $ Wall Column Line 8.3-b
2022     259.0    153.5    8.0      $ Wall Column Line 9-a
2023     259.0    250.5    8.0      $ Wall Column Line 9-b
2024     259.0    312.0    8.0      $ Wall Column Line 9-c
2025     295.0    5.1      8.0      $ Wall Column Line 10-a
2026     295.0    42.3     8.0      $ Wall Column Line 10-b
2027     295.0    130.5    8.0      $ Wall Column Line 10-c
2028     295.0    223.0    8.0      $ Wall Column Line 10-d
2029     295.0    269.8    8.0      $ Wall Column Line 10-e
2030     295.0    291.8    8.0      $ Wall Column Line 10-f
2031     295.0    312.0    8.0      $ Wall Column Line 10-g
2032     344.0    177.8    8.0      $ Wall Column Line 11-a
2033     344.0    218.8    8.0      $ Wall Column Line 11-b
2034     344.0    268.8    8.0      $ Wall Column Line 11-c
2035     344.0    298.3    8.0      $ Wall Column Line 11-d
2036     377.0    265.0    8.0      $ Wall Column Line 12-a
2037     377.0    300.0    8.0      $ Wall Column Line 12-b
2038     442.0    37.0     8.0      $ Wall Column Line 13-a
2039     442.0    123.3    8.0      $ Wall Column Line 13-b
2040     442.0    268.5    8.0      $ Wall Column Line 13-c
```

```
2041     442.0    300.0    8.0      $ Wall Column Line 13-d
2042     442.0    373.0    8.0      $ Wall Column Line 13-e
2043     442.0    446.9    8.0      $ Wall Column Line 13-f
$
2044     53.4     492.0    13.0     $ Wall Column Line A-a
2045     157.6    492.0    13.0     $ Wall Column Line A-b
2046     334.9    492.0    13.0     $ Wall Column Line A-c
2047     111.0    414.0    13.0     $ Wall Column Line D-a
2048     231.5    414.0    13.0     $ Wall Column Line D-b
2049     288.0    414.0    13.0     $ Wall Column Line D-c
2050     319.3    388.0    8.0      $ Wall Column Line E-a
2051     392.0    388.0    8.0      $ Wall Column Line E-b
2052     201.5    274.0    8.0      $ Wall Column Line J-a
2053     220.5    274.0    8.0      $ Wall Column Line J-b
2054     335.0    274.0    8.0      $ Wall Column Line J-c
2055     388.6    274.0    8.0      $ Wall Column Line J-d
2056     17.1     180.0    8.0      $ Wall Column Line L-a
2057     103.5    180.0    8.0      $ Wall Column Line L-b
2058     1.1      119.0    15.0     $ Wall Column Line N-a
2059     66.6     119.0    15.0     $ Wall Column Line N-b
2060     121.9    119.0    15.0     $ Wall Column Line N-c
2061     378.0    119.0    8.0      $ Wall Column Line N-d
2062     438.4    119.0    8.0      $ Wall Column Line N-e
2063     18.4     80.0     8.0      $ Wall Column Line O-a
2064     77.3     80.0     8.0      $ Wall Column Line O-b
2065     134.3    80.0     8.0      $ Wall Column Line O-c
2066     225.9    80.0     8.0      $ Wall Column Line O-d
2067     305.5    80.0     8.0      $ Wall Column Line O-e
2068     176.3    50.0     8.0      $ Wall Column Line P-a
2069     223.8    50.0     8.0      $ Wall Column Line P-b
2070     274.5    50.0     8.0      $ Wall Column Line P-c
2071     7.9      0.0      8.0      $ Wall Column Line R-a
2072     69.1     0.0      8.0      $ Wall Column Line R-b
2073     134.9    0.0      8.0      $ Wall Column Line R-c
2074     183.5    0.0      8.0      $ Wall Column Line R-d
2075     238.5    0.0      8.0      $ Wall Column Line R-e
2076     305.5    0.0      8.0      $ Wall Column Line R-f
$
$ Elev. 32
101      0.0      246.0    32.0     $ Wall Column Line 1-1
102      48.0     247.3    32.0     $ Wall Column Line 3-1
103      89.0     281.5    32.0     $ Wall Column Line 3.5-1
104      123.0    193.8    32.0     $ Wall Column Line 4-1
105      123.0    295.5    32.0     $ Wall Column Line 4-2
106      123.0    398.4    32.0     $ Wall Column Line 4-3
107      147.0    38.9     32.0     $ Wall Column Line 5-1
108      147.0    122.1    32.0     $ Wall Column Line 5-2
109      147.0    192.6    32.0     $ Wall Column Line 5-3
110      147.0    243.5    32.0     $ Wall Column Line 5-4
111      147.0    295.0    32.0     $ Wall Column Line 5-5
112      147.0    346.5    32.0     $ Wall Column Line 5-6
113      147.0    442.5    32.0     $ Wall Column Line 5-7
114      171.0    80.6     32.0     $ Wall Column Line 6-1
115      195.0    139.6    32.0     $ Wall Column Line 7-1
116      195.0    237.0    32.0     $ Wall Column Line 7-2
117      195.0    412.0    32.0     $ Wall Column Line 7-3
118      207.0    453.9    32.0     $ Wall Column Line 7.5-1
119      225.0    388.0    32.0     $ Wall Column Line 8.3-1
120      259.0    216.5    32.0     $ Wall Column Line 9-1
121      259.0    386.0    32.0     $ Wall Column Line 9-2
122      295.0    122.1    32.0     $ Wall Column Line 10-1
123      295.0    289.0    32.0     $ Wall Column Line 10-2
124      295.0    386.0    32.0     $ Wall Column Line 10-3
125      277.0    93.1     32.0     $ Wall Column Line 9.5-1
126      344.0    133.5    32.0     $ Wall Column Line 11-1
127      344.0    211.0    32.0     $ Wall Column Line 11-2
128      344.0    289.0    32.0     $ Wall Column Line 11-3
129      344.0    373.0    32.0     $ Wall Column Line 11-4
130      344.0    446.9    32.0     $ Wall Column Line 11-5
131      377.0    216.8    32.0     $ Wall Column Line 12-1
132      377.0    289.0    32.0     $ Wall Column Line 12-2
133      377.0    373.0    32.0     $ Wall Column Line 12-3
134      442.0    78.1     32.0     $ Wall Column Line 13-1
135      442.0    210.8    32.0     $ Wall Column Line 13-2
136      442.0    288.8    32.0     $ Wall Column Line 13-3
137      442.0    425.9    32.0     $ Wall Column Line 13-4
$
138      221.0    492.0    32.0     $ Wall Column Line A-1
139      171.0    466.0    32.0     $ Wall Column Line B-1
140      184.0    414.0    32.0     $ Wall Column Line D-1
141      95.0     402.0    32.0     $ Wall Column Line D.5-1
142      119.9    388.0    32.0     $ Wall Column Line E-1
143      369.1    388.0    32.0     $ Wall Column Line E-2
144      114.3    362.0    32.0     $ Wall Column Line F-1
145      246.6    362.0    32.0     $ Wall Column Line F-2
146      114.3    336.0    32.0     $ Wall Column Line G-1
```

```
147      269.5    336.0    32.0     $ Wall Column Line G-2
148      210.0    274.0    32.0     $ Wall Column Line J-5
149      119.9    310.0    32.0     $ Wall Column Line H-1
150      270.6    310.0    32.0     $ Wall Column Line H-2
151      119.9    283.5    32.0     $ Wall Column Line H.75-1
152      305.5    274.0    32.0     $ Wall Column Line J-1
153      388.9    274.0    32.0     $ Wall Column Line J-2
154      114.3    257.5    32.0     $ Wall Column Line J.4-1
155      114.3    231.0    32.0     $ Wall Column Line J.9-1
156      305.5    226.0    32.0     $ Wall Column Line K-1
157      339.0    226.0    32.0     $ Wall Column Line K-2
158      409.5    226.0    32.0     $ Wall Column Line K-3
159      119.9    204.5    32.0     $ Wall Column Line K.5-1
160      279.2    204.5    32.0     $ Wall Column Line K.5-2
161      271.0    192.0    32.0     $ Wall Column Line K.8-1
162      72.6     180.0    32.0     $ Wall Column Line L-1
163      396.6    180.0    32.0     $ Wall Column Line L-2
165      205.0    154.0    32.0     $ Wall Column Line M-1
166      305.5    154.0    32.0     $ Wall Column Line M-2
168      56.9     119.0    32.0     $ Wall Column Line N-1
169      225.5    119.0    32.0     $ Wall Column Line N-2
170      305.5    119.0    32.0     $ Wall Column Line N-3
171      388.9    119.0    32.0     $ Wall Column Line N-4
172      73.6     80.0     32.0     $ Wall Column Line O-1
173      242.4    80.0     32.0     $ Wall Column Line O-2
174      388.9    80.0     32.0     $ Wall Column Line O-3
175      227.1    50.0     32.0     $ Wall Column Line P-1
176      73.6     0.0      32.0     $ Wall Column Line R-1
177      242.5    0.0      32.0     $ Wall Column Line R-2
178      388.9    0.0      32.0     $ Wall Column Line R-3
179      135.0    136.5    32.0     $ Wall Column Line 4.5-1
180      147.0    397.8    32.0     $ Wall Column Line 5-9
181      225.0    290.0    32.0     $ Wall Column Line 8.3-4
182      410.6    336.0    32.0     $ Wall Column Line G-3
183      344.0    86.8     32.0     $ Wall Column Line 11-8
184      384.0    85.3     32.0     $ Wall Column Line 12.1-1
185      384.0    113.8    32.0     $ Wall Column Line 12.1-2
186      -17.8    145.0    32.0     $ Wall Column Line M.3-1
187      69.9     145.0    32.0     $ Wall Column Line M.3-2
$
201      0.0      246.0    32.0     $ Wall Column Line 1-2
202      48.0     98.1     32.0     $ Wall Column Line 3-2
203      48.0     297.1    32.0     $ Wall Column Line 3-3
204      89.0     303.3    32.0     $ Wall Column Line 3.5-2
205      123.0    296.9    32.0     $ Wall Column Line 4-4
206      147.0    266.5    32.0     $ Wall Column Line 5-8
207      171.0    99.5     32.0     $ Wall Column Line 6-2
208      195.0    310.0    32.0     $ Wall Column Line 7-4
209      259.0    266.5    32.0     $ Wall Column Line 9-3
210      295.0    39.9     32.0     $ Wall Column Line 10-4
211      295.0    266.5    32.0     $ Wall Column Line 10-5
212      344.0    255.0    32.0     $ Wall Column Line 11-6
213      442.0    245.4    32.0     $ Wall Column Line 13-5
$
214      221.1    492.0    32.0     $ Wall Column Line A-2
215      171.0    466.0    32.0     $ Wall Column Line B-2
216      208.0    414.0    32.0     $ Wall Column Line D-7
217      99.3     414.0    32.0     $ Wall Column Line D-2
218      276.5    414.0    32.0     $ Wall Column Line D-3
219      106.0    402.0    32.0     $ Wall Column Line D.5-2
220      371.9    388.0    32.0     $ Wall Column Line E-3
221      210.0    274.0    32.0     $ Wall Column Line J-6
222      207.0    310.0    32.0     $ Wall Column Line H-3
223      322.7    310.0    32.0     $ Wall Column Line H-4
224      396.3    274.0    32.0     $ Wall Column Line J-3
225      395.9    226.0    32.0     $ Wall Column Line K-4
226      85.8     192.0    32.0     $ Wall Column Line K.8-2
227      73.4     180.0    32.0     $ Wall Column Line L-3
228      395.9    180.0    32.0     $ Wall Column Line L-4
229      171.0    154.0    32.0     $ Wall Column Line M-3
230      73.4     119.0    32.0     $ Wall Column Line N-5
231      301.4    119.0    32.0     $ Wall Column Line N-6
232      13.6     80.0     32.0     $ Wall Column Line O-4
233      248.4    80.0     32.0     $ Wall Column Line O-5
234      222.2    0.0      32.0     $ Wall Column Line R-4
235      225.0    344.0    32.0     $ Wall Column Line 8.3-2
236      147.0    442.5    32.0     $ Wall Column Line 5-10
237      395.6    336.0    32.0     $ Wall Column Line G-4
238      384.0    99.5     32.0     $ Wall Column Line 12.1-3
$ Elev 66
301      0.0      246.0    66.0     $ Wall Column Line 1-2
302      48.0     98.1     66.0     $ Wall Column Line 3-2
303      48.0     297.1    66.0     $ Wall Column Line 3-3
304      89.0     303.3    66.0     $ Wall Column Line 3.5-2
305      123.0    296.9    66.0     $ Wall Column Line 4-4
306      147.0    266.5    66.0     $ Wall Column Line 5-8
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307      171.0    99.5     66.0     $ Wall Column Line 6-2
308      195.0    310.0    66.0     $ Wall Column Line 7-4
309      259.0    266.5    66.0     $ Wall Column Line 9-3
310      295.0    39.9     66.0     $ Wall Column Line 10-4
311      295.0    266.5    66.0     $ Wall Column Line 10-5
312      344.0    255.0    66.0     $ Wall Column Line 11-6
313      442.0    245.4    66.0     $ Wall Column Line 13-5
$
314      221.1    492.0    66.0     $ Wall Column Line A-2
315      171.0    466.0    66.0     $ Wall Column Line B-2
316      208.0    414.0    66.0     $ Wall Column Line D-7
317      99.3     414.0    66.0     $ Wall Column Line D-2
318      276.5    414.0    66.0     $ Wall Column Line D-3
319      106.0    402.0    66.0     $ Wall Column Line D.5-2
320      371.9    388.0    66.0     $ Wall Column Line E-3
321      210.0    274.0    66.0     $ Wall Column Line J-6
322      207.0    310.0    66.0     $ Wall Column Line H-3
323      322.7    310.0    66.0     $ Wall Column Line H-4
324      396.3    274.0    66.0     $ Wall Column Line J-3
325      395.9    226.0    66.0     $ Wall Column Line K-4
326      85.8     192.0    66.0     $ Wall Column Line K.8-2
327      73.4     180.0    66.0     $ Wall Column Line L-3
328      395.9    180.0    66.0     $ Wall Column Line L-4
329      171.0    154.0    66.0     $ Wall Column Line M-3
330      73.4     119.0    66.0     $ Wall Column Line N-5
331      301.4    119.0    66.0     $ Wall Column Line N-6
332      13.6     80.0     66.0     $ Wall Column Line O-4
333      248.4    80.0     66.0     $ Wall Column Line O-5
334      222.2    0.0      66.0     $ Wall Column Line R-4
335      225.0    344.0    66.0     $ Wall Column Line 8.3-2
336      147.0    442.5    66.0     $ Wall Column Line 5-10
337      395.6    336.0    66.0     $ Wall Column Line G-4
338      384.0    99.5     66.0     $ Wall Column Line 12.1-3
$
401      0.0      235.3    66.0     $ Wall Column Line 1-3
402      48.0     299.5    66.0     $ Wall Column Line 3-4
403      123.0    296.8    66.0     $ Wall Column Line 4-5
404      195.0    344.0    66.0     $ Wall Column Line 7-5
405      225.0    344.0    66.0     $ Wall Column Line 8.3-3
406      259.0    266.5    66.0     $ Wall Column Line 9-4
407      295.0    39.9     66.0     $ Wall Column Line 10-6
408      295.0    266.5    66.0     $ Wall Column Line 10-7
409      344.0    252.5    66.0     $ Wall Column Line 11-7
$
410      221.1    492.0    66.0     $ Wall Column Line A-3
411      210.0    414.0    66.0     $ Wall Column Line D-8
412      83.8     414.0    66.0     $ Wall Column Line D-4
413      276.5    414.0    66.0     $ Wall Column Line D-5
414      368.4    388.0    66.0     $ Wall Column Line E-4
415      210.0    274.0    66.0     $ Wall Column Line J-7
416      207.0    310.0    66.0     $ Wall Column Line H-5
417      319.3    310.0    66.0     $ Wall Column Line H-6
418      394.4    274.0    66.0     $ Wall Column Line J-4
419      393.6    226.0    66.0     $ Wall Column Line K-5
420      88.5     180.0    66.0     $ Wall Column Line L-5
421      393.6    180.0    66.0     $ Wall Column Line L-6
422      142.9    119.0    66.0     $ Wall Column Line N-7
423      305.6    119.0    66.0     $ Wall Column Line N-8
424      282.6    80.0     66.0     $ Wall Column Line O-6
425      223.3    0.0      66.0     $ Wall Column Line R-5
426      442.0    245.5    66.0     $ Wall Column Line 13-6
427      393.1    336.0    66.0     $ Wall Column Line G-5
428      123.0    99.5     66.0     $ Wall Column Line 4-7
429      384.0    99.5     66.0     $ Wall Column Line 12.1-4
$ Elev 100
501      0.0      235.3    100.0    $ Wall Column Line 1-3
502      48.0     299.5    100.0    $ Wall Column Line 3-4
503      123.0    296.8    100.0    $ Wall Column Line 4-5
504      195.0    344.0    100.0    $ Wall Column Line 7-5
505      225.0    344.0    100.0    $ Wall Column Line 8.3-3
506      259.0    266.5    100.0    $ Wall Column Line 9-4
507      295.0    39.9     100.0    $ Wall Column Line 10-6
508      295.0    266.5    100.0    $ Wall Column Line 10-7
509      344.0    252.5    100.0    $ Wall Column Line 11-7
$
510      221.1    492.0    100.0    $ Wall Column Line A-3
511      210.0    414.0    100.0    $ Wall Column Line D-8
512      83.8     414.0    100.0    $ Wall Column Line D-4
513      276.5    414.0    100.0    $ Wall Column Line D-5
514      368.4    388.0    100.0    $ Wall Column Line E-4
515      210.0    274.0    100.0    $ Wall Column Line J-7
516      207.0    310.0    100.0    $ Wall Column Line H-5
517      319.3    310.0    100.0    $ Wall Column Line H-6
518      394.4    274.0    100.0    $ Wall Column Line J-4
519      393.6    226.0    100.0    $ Wall Column Line K-5
520      88.5     180.0    100.0    $ Wall Column Line L-5
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521      393.6    180.0    100.0    $ Wall Column Line L-6
522      142.9    119.0    100.0    $ Wall Column Line N-7
523      305.6    119.0    100.0    $ Wall Column Line N-8
524      282.6    80.0     100.0    $ Wall Column Line O-6
525      223.3    0.0      100.0    $ Wall Column Line R-5
526      442.0    245.5    100.0    $ Wall Column Line 13-6
527      393.1    336.0    100.0    $ Wall Column Line G-5
528      123.0    99.5     100.0    $ Wall Column Line 4-7
529      384.0    99.5     100.0    $ Wall Column Line 12.1-4
$
601      48.0     297.3    100.0    $ Wall Column Line 3-5
602      123.0    296.8    100.0    $ Wall Column Line 4-6
$
603      85.0     414.0    100.0    $ Wall Column Line D-6
604      91.5     180.0    100.0    $ Wall Column Line L-7
$ Elev 107
701      48.0     297.3    107.0    $ Wall Column Line 3-5
702      123.0    296.8    107.0    $ Wall Column Line 4-6
$
703      85.0     414.0    107.0    $ Wall Column Line D-6
704      91.5     180.0    107.0    $ Wall Column Line L-7
$ Master Nodes (Center of Rigidity) and Center of Mass Nodes
99       212.45   253.53   -4.0     $ Center of Mass at EL. 0.0
100      221.00   246.00   -4.0     $ Master Node at Base slab (Center of Rigidity)
199      211.17   247.27   31.5     $ Center of Mass at EL. 31.5
200      204.81   244.91   31.5     $ Master Node at EL. 31.5 (Center of Rigidity)
399      207.22   247.93   65.5     $ Center of Mass at EL. 65.5
400      206.53   223.49   65.5     $ Master Node at EL. 65.5 (Center of Rigidity)
599      243.24   237.19   99.5     $ Center of Mass at EL. 99.5
600      230.62   222.66   99.5     $ Master Node at EL. 99.5 (Center of Rigidity)
700      85.50    297.00   106.5    $ Master Node at EL. 106.5 (Center of Rigidity and Center of Mass)
$
TYPE SPACE FRAME
MEMBER INCIDENCES
'1-1'    1        101
'1-a'    1000     2000
'1-b'    1001     2001
'1-c'    1002     2002
'1-d'    1003     2003
'1-e'    1004     2004
'1-f'    1005     2005
'1-2'    201      301
'1-3'    401      501
'3-1'    2        102
'3-a'    1006     2006
'3-b'    1007     2007
'3-c'    1008     2008
'3-d'    1009     2009
'3-e'    1010     2010
'3-2'    202      302
'3-3'    203      303
'3-4'    402      502
'3-5'    601      701
'3.5-1'  3        103
'3.5-2'  204      304
'3.5-a'  1011     2011
'3.5-b'  1012     2012
'3.5-c'  1013     2013
'3.5-d'  1014     2014
'3.5-e'  1015     2015
'4-1'    4        104
'4-a'    1016     2016
'4-b'    1017     2017
'4-2'    5        105
'4-3'    6        106
'4-4'    205      305
'4-5'    403      503
'4-6'    602      702
'4-7'    428      528
'4.5-1'  79       179
'5-1'    7        107
'5-2'    8        108
'5-3'    9        109
'5-4'    10       110
'5-5'    11       111
'5-6'    12       112
'5-7'    13       113
'5-a'    1018     2018
'5-b'    1019     2019
'5-8'    206      306
'5-9'    80       180
'5-10'   236      336
'6-1'    14       114
'6-2'    207      307
'7-1'    15       115
'7-2'    16       116
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'7-3'	17	117
'7-4'	208	308
'7-5'	404	504
'7.5-1'	18	118
'8.3-1'	19	119
'8.3-2'	235	335
'8.3-3'	405	505
'8.3-4'	81	181
'8.3-a'	1020	2020
'8.3-b'	1021	2021
'9-1'	20	120
'9-2'	21	121
'9-3'	209	309
'9-4'	406	506
'9-a'	1022	2022
'9-b'	1023	2023
'9-c'	1024	2024
'10-1'	22	122
'10-2'	23	123
'10-3'	24	124
'10-4'	210	310
'10-5'	211	311
'10-6'	407	507
'10-7'	408	508
'10-a'	1025	2025
'10-b'	1026	2026
'10-c'	1027	2027
'10-d'	1028	2028
'10-e'	1029	2029
'10-f'	1030	2030
'10-g'	1031	2031
'9.5-1'	25	125
'11-1'	26	126
'11-2'	27	127
'11-3'	28	128
'11-4'	29	129
'11-5'	30	130
'11-6'	212	312
'11-7'	409	509
'11-8'	83	183
'11-a'	1032	2032
'11-b'	1033	2033
'11-c'	1034	2034
'11-d'	1035	2035
'12-1'	31	131
'12-2'	32	132
'12-3'	33	133
'12-a'	1036	2036
'12-b'	1037	2037
'12.1-1'	84	184
'12.1-2'	85	185
'12.1-3'	238	338
'12.1-4'	429	529
'13-1'	34	134
'13-2'	35	135
'13-3'	36	136
'13-4'	37	137
'13-5'	213	313
'13-6'	426	526
'13-a'	1038	2038
'13-b'	1039	2039
'13-c'	1040	2040
'13-d'	1041	2041
'13-e'	1042	2042
'13-f'	1043	2043
'A-1'	38	138
'A-a'	1044	2044
'A-b'	1045	2045
'A-c'	1046	2046
'A-2'	214	314
'A-3'	410	510
'B-1'	39	139
'B-2'	215	315
'D-1'	40	140
'D-a'	1047	2047
'D-b'	1048	2048
'D-c'	1049	2049
'D-2'	217	317
'D-3'	218	318
'D-4'	412	512
'D-5'	413	513
'D-6'	603	703
'D-7'	216	316
'D-8'	411	511
'D.5-1'	41	141
'D.5-2'	219	319

'E-1'	42	142
'E-2'	43	143
'E-a'	1050	2050
'E-b'	1051	2051
'E-3'	220	320
'E-4'	414	514
'F-1'	44	144
'F-2'	45	145
'G-1'	46	146
'G-2'	47	147
'G-3'	82	182
'G-4'	237	337
'G-5'	427	527
'H-1'	49	149
'H-2'	50	150
'H-3'	222	322
'H-4'	223	323
'H-5'	416	516
'H-6'	417	517
'H.75-1'	51	151
'J-1'	52	152
'J-2'	53	153
'J-c'	1054	2054
'J-d'	1055	2055
'J-3'	224	324
'J-4'	418	518
'J-5'	48	148
'J-a'	1052	2052
'J-b'	1053	2053
'J-6'	221	321
'J-7'	415	515
'J.4-1'	54	154
'J.9-1'	55	155
'K-1'	56	156
'K-2'	57	157
'K-3'	58	158
'K-4'	225	325
'K-5'	419	519
'K.5-1'	59	159
'K.5-2'	60	160
'K.8-1'	61	161
'K.8-2'	226	326
'L-1'	62	162
'L-a'	1056	2056
'L-b'	1057	2057
'L-2'	63	163
'L-3'	227	327
'L-4'	228	328
'L-5'	420	520
'L-6'	421	521
'L-7'	604	704
'M-1'	65	165
'M-2'	66	166
'M-3'	229	329
'M.3-1'	86	186
'M.3-2'	87	187
'N-1'	68	168
'N-a'	1058	2058
'N-b'	1059	2059
'N-c'	1060	2060
'N-2'	69	169
'N-3'	70	170
'N-4'	71	171
'N-d'	1061	2061
'N-e'	1062	2062
'N-5'	230	330
'N-6'	231	331
'N-7'	422	522
'N-8'	423	523
'O-1'	72	172
'O-a'	1063	2063
'O-b'	1064	2064
'O-c'	1065	2065
'O-2'	73	173
'O-d'	1066	2066
'O-e'	1067	2067
'O-3'	74	174
'O-4'	232	332
'O-5'	233	333
'O-6'	424	524
'P-1'	75	175
'P-a'	1068	2068
'P-b'	1069	2069
'P-c'	1070	2070
'R-1'	76	176
'R-a'	1071	2071

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'R-b'    1072     2072
'R-c'    1073     2073
'R-2'    77       177
'R-d'    1074     2074
'R-e'    1075     2075
'R-f'    1076     2076
'R-3'    78       178
'R-4'    234      334
'R-5'    425      525
$
'dummy 1'        199      200
'dummy 2'        399      400
'dummy 3'        599      600
'dummy 4'        99       100
$
CONSTANTS
E        617302.00          MEMBERS  ALL
POISSON  0.17     MEMBERS   ALL
G        263804.27          MEMBERS  ALL
DENSITY  0.000000001        MEMBERS  ALL
$
BETA     90.000000000       MEMBER   'A-1'
BETA     90.000000000       MEMBER   'A-a'
BETA     90.000000000       MEMBER   'A-b'
BETA     90.000000000       MEMBER   'A-c'
BETA     90.000000000       MEMBER   'A-2'
BETA     90.000000000       MEMBER   'A-3'
BETA     90.000000000       MEMBER   'B-1'
BETA     90.000000000       MEMBER   'B-2'
BETA     90.000000000       MEMBER   'D-1'
BETA     90.000000000       MEMBER   'D-a'
BETA     90.000000000       MEMBER   'D-b'
BETA     90.000000000       MEMBER   'D-c'
BETA     90.000000000       MEMBER   'D-2'
BETA     90.000000000       MEMBER   'D-3'
BETA     90.000000000       MEMBER   'D-4'
BETA     90.000000000       MEMBER   'D-5'
BETA     90.000000000       MEMBER   'D-6'
BETA     90.000000000       MEMBER   'D-7'
BETA     90.000000000       MEMBER   'D-8'
BETA     90.000000000       MEMBER   'D.5-1'
BETA     90.000000000       MEMBER   'D.5-2'
BETA     90.000000000       MEMBER   'E-1'
BETA     90.000000000       MEMBER   'E-2'
BETA     90.000000000       MEMBER   'E-a'
BETA     90.000000000       MEMBER   'E-b'
BETA     90.000000000       MEMBER   'E-3'
BETA     90.000000000       MEMBER   'E-4'
BETA     90.000000000       MEMBER   'F-1'
BETA     90.000000000       MEMBER   'F-2'
BETA     90.000000000       MEMBER   'G-1'
BETA     90.000000000       MEMBER   'G-2'
BETA     90.000000000       MEMBER   'G-3'
BETA     90.000000000       MEMBER   'G-4'
BETA     90.000000000       MEMBER   'G-5'
BETA     90.000000000       MEMBER   'H-1'
BETA     90.000000000       MEMBER   'H-2'
BETA     90.000000000       MEMBER   'H-3'
BETA     90.000000000       MEMBER   'H-4'
BETA     90.000000000       MEMBER   'H-5'
BETA     90.000000000       MEMBER   'H-6'
BETA     90.000000000       MEMBER   'H.75-1'
BETA     90.000000000       MEMBER   'J-1'
BETA     90.000000000       MEMBER   'J-2'
BETA     90.000000000       MEMBER   'J-c'
BETA     90.000000000       MEMBER   'J-d'
BETA     90.000000000       MEMBER   'J-3'
BETA     90.000000000       MEMBER   'J-4'
BETA     90.000000000       MEMBER   'J-5'
BETA     90.000000000       MEMBER   'J-a'
BETA     90.000000000       MEMBER   'J-b'
BETA     90.000000000       MEMBER   'J-6'
BETA     90.000000000       MEMBER   'J-7'
BETA     90.000000000       MEMBER   'J.4-1'
BETA     90.000000000       MEMBER   'J.9-1'
BETA     90.000000000       MEMBER   'K-1'
BETA     90.000000000       MEMBER   'K-2'
BETA     90.000000000       MEMBER   'K-3'
BETA     90.000000000       MEMBER   'K-4'
BETA     90.000000000       MEMBER   'K-5'
BETA     90.000000000       MEMBER   'K.5-1'
BETA     90.000000000       MEMBER   'K.5-2'
BETA     90.000000000       MEMBER   'K.8-1'
BETA     90.000000000       MEMBER   'K.8-2'
BETA     90.000000000       MEMBER   'L-1'
BETA     90.000000000       MEMBER   'L-a'
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BETA     90.000000000     MEMBER   'L-b'
BETA     90.000000000     MEMBER   'L-2'
BETA     90.000000000     MEMBER   'L-3'
BETA     90.000000000     MEMBER   'L-4'
BETA     90.000000000     MEMBER   'L-5'
BETA     90.000000000     MEMBER   'L-6'
BETA     90.000000000     MEMBER   'L-7'
BETA     90.000000000     MEMBER   'M-1'
BETA     90.000000000     MEMBER   'M-2'
BETA     90.000000000     MEMBER   'M-3'
BETA     90.000000000     MEMBER   'M.3-1'
BETA     90.000000000     MEMBER   'M.3-2'
BETA     90.000000000     MEMBER   'N-1'
BETA     90.000000000     MEMBER   'N-a'
BETA     90.000000000     MEMBER   'N-b'
BETA     90.000000000     MEMBER   'N-c'
BETA     90.000000000     MEMBER   'N-2'
BETA     90.000000000     MEMBER   'N-3'
BETA     90.000000000     MEMBER   'N-4'
BETA     90.000000000     MEMBER   'N-d'
BETA     90.000000000     MEMBER   'N-e'
BETA     90.000000000     MEMBER   'N-5'
BETA     90.000000000     MEMBER   'N-6'
BETA     90.000000000     MEMBER   'N-7'
BETA     90.000000000     MEMBER   'N-8'
BETA     90.000000000     MEMBER   'O-1'
BETA     90.000000000     MEMBER   'O-a'
BETA     90.000000000     MEMBER   'O-b'
BETA     90.000000000     MEMBER   'O-c'
BETA     90.000000000     MEMBER   'O-2'
BETA     90.000000000     MEMBER   'O-d'
BETA     90.000000000     MEMBER   'O-e'
BETA     90.000000000     MEMBER   'O-3'
BETA     90.000000000     MEMBER   'O-4'
BETA     90.000000000     MEMBER   'O-5'
BETA     90.000000000     MEMBER   'O-6'
BETA     90.000000000     MEMBER   'P-1'
BETA     90.000000000     MEMBER   'P-a'
BETA     90.000000000     MEMBER   'P-b'
BETA     90.000000000     MEMBER   'P-c'
BETA     90.000000000     MEMBER   'R-1'
BETA     90.000000000     MEMBER   'R-a'
BETA     90.000000000     MEMBER   'R-b'
BETA     90.000000000     MEMBER   'R-c'
BETA     90.000000000     MEMBER   'R-2'
BETA     90.000000000     MEMBER   'R-d'
BETA     90.000000000     MEMBER   'R-e'
BETA     90.000000000     MEMBER   'R-f'
BETA     90.000000000     MEMBER   'R-3'
BETA     90.000000000     MEMBER   'R-4'
BETA     90.000000000     MEMBER   'R-5'
$
MEMBER   PROPERTIES       PRISMATIC

'1-1'    AX      2997.0   AY      2497.5   AZ      0.001    IX      35964.0  IY      8991.0   IZ      62312687.4
'1-a'    AX      427.5    AY      356.3    AZ      0.001    IX      5130.0   IY      1282.5   IZ      180852.5
'1-b'    AX      312.0    AY      260.0    AZ      0.001    IX      3744.0   IY      936.0    IZ      70304.0
'1-c'    AX      253.5    AY      211.3    AZ      0.001    IX      3042.0   IY      760.5    IZ      37709.4
'1-d'    AX      388.5    AY      323.8    AZ      0.001    IX      4662.0   IY      1165.5   IZ      135734.2
'1-e'    AX      834.0    AY      695.0    AZ      0.001    IX      10008.0  IY      2502.0   IZ      1342809.5
'1-f'    AX      496.5    AY      413.8    AZ      0.001    IX      5958.0   IY      1489.5   IZ      283317.9
$
'1-2'    AX      2234.3   AY      1820.3   AZ      0.001    -
         IX      13995.3  IY      3498.8   IZ      45897499.5
'1-3'    AX      1489.5   AY      1138.4   AZ      0.001    -
         IX      4153.5   IY      1038.4   IZ      30598333.0
$
'3-1'    AX      1350.0   AY      1125.0   AZ      0.001    IX      7200.0   IY      1800.0   IZ      12814453.1
'3-a'    AX      99.0     AY      82.5     AZ      0.001    IX      528.0    IY      132.0    IZ      5053.6
'3-b'    AX      57.0     AY      47.5     AZ      0.001    IX      304.0    IY      76.0     IZ      964.5
'3-c'    AX      169.0    AY      140.8    AZ      0.001    IX      901.3    IY      225.3    IZ      25139.6
'3-d'    AX      285.0    AY      237.5    AZ      0.001    IX      1520.0   IY      380.0    IZ      120568.4
'3-e'    AX      538.0    AY      448.3    AZ      0.001    IX      2869.3   IY      717.3    IZ      811046.2
$
'3-2'    AX      107.5    AY      89.6     AZ      0.001    -
         IX      580.7    IY      145.2    IZ      301695.0
'3-3'    AX      726.8    AY      589.6    AZ      0.001    -
         IX      1995.8   IY      498.9    IZ      3554114.1
'3-4'    AX      712.5    AY      582.6    AZ      0.001    -
         IX      2007.0   IY      501.8    IZ      3349121.1
'3-5'    AX      712.5    AY      593.8    AZ      0.001    -
         IX      2137.5   IY      534.4    IZ      3349121.1
$
'3.5-1'  AX      1076.0   AY      896.7    AZ      0.001    IX      5738.7   IY      1434.7   IZ      6488369.7
'3.5-a'  AX      140.0    AY      116.7    AZ      0.001    IX      746.7    IY      186.7    IZ      14291.7
'3.5-b'  AX      197.0    AY      164.2    AZ      0.001    IX      1050.7   IY      262.7    IZ      39819.7
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'3.5-c'  AX      177.0    AY      147.5    AZ      0.001    IX      944.0    IY      236.0    IZ      28881.4
'3.5-d'  AX      178.0    AY      148.3    AZ      0.001    IX      949.3    IY      237.3    IZ      29373.7
'3.5-e'  AX      208.0    AY      173.3    AZ      0.001    IX      1109.3   IY      277.3    IZ      46869.3
$
'3.5-2'  AX      904.0    AY      734.7    AZ      0.001     -
         IX      4352.0   IY      1088.0   IZ      3847725.3
'4-1'    AX      114.0    AY      87.8     AZ      0.001     -
         IX      458.7    IY      114.7    IZ      3312.8
$
'4-2'    AX      112.0    AY      93.3     AZ      0.001    IX      597.3    IY      149.3    IZ      7317.3
'4-a'    AX      36.0     AY      30.0     AZ      0.001    IX      192.0    IY      48.0     IZ      243.0
'4-b'    AX      36.0     AY      30.0     AZ      0.001    IX      192.0    IY      48.0     IZ      243.0
$
'4-3'    AX      126.0    AY      95.5     AZ      0.001     -
         IX      480.0    IY      120.0    IZ      3796.9
'4-4'    AX      952.0    AY      787.5    AZ      0.001     -
         IX      4922.7   IY      1230.7   IZ      3465468.8
'4-5'    AX      712.5    AY      593.8    AZ      0.001     -
         IX      2137.5   IY      534.4    IZ      3349121.1
'4-6'    AX      712.5    AY      593.8    AZ      0.001     -
         IX      2137.5   IY      534.4    IZ      3349121.1
'4-7'    AX      172.0    AY      143.3    AZ      0.001     -
         IX      917.3    IY      229.3    IZ      26502.3
'4.5-1'  AX      156.0    AY      130.0    AZ      0.001     -
         IX      832.0    IY      208.0    IZ      19773.0
'5-1'    AX      341.0    AY      284.2    AZ      0.001     -
         IX      1818.7   IY      454.7    IZ      206519.9
'5-2'    AX      305.0    AY      254.2    AZ      0.001     -
         IX      1626.7   IY      406.7    IZ      147774.1
'5-3'    AX      143.0    AY      119.2    AZ      0.001     -
         IX      762.7    IY      190.7    IZ      15230.2
'5-4'    AX      156.0    AY      130.0    AZ      0.001     -
         IX      832.0    IY      208.0    IZ      19773.0
'5-5'    AX      144.0    AY      120.0    AZ      0.001     -
         IX      768.0    IY      192.0    IZ      15552.0
'5-6'    AX      156.0    AY      130.0    AZ      0.001     -
         IX      832.0    IY      208.0    IZ      19773.0
$
'5-7'    AX      200.0    AY      166.7    AZ      0.001    IX      1066.7   IY      266.7    IZ      41666.7
'5-a'    AX      64.0     AY      53.3     AZ      0.001    IX      341.3    IY      85.3     IZ      1365.3
'5-b'    AX      108.0    AY      90.0     AZ      0.001    IX      576.0    IY      144.0    IZ      6561.0
$
'5-8'    AX      1196.0   AY      996.7    AZ      0.001     -
         IX      6378.7   IY      1594.7   IZ      8910299.7
'5-9'    AX      142.0    AY      118.3    AZ      0.001     -
         IX      757.3    IY      189.3    IZ      14913.0
'5-10'   AX      200.0    AY      166.7    AZ      0.001     -
         IX      1066.7   IY      266.7    IZ      41666.7
'6-1'    AX      603.0    AY      502.5    AZ      0.001     -
         IX      3216.0   IY      804.0    IZ      1141959.5
'6-2'    AX      172.0    AY      143.3    AZ      0.001     -
         IX      917.3    IY      229.3    IZ      26502.3
'7-1'    AX      131.0    AY      109.2    AZ      0.001     -
         IX      698.7    IY      174.7    IZ      11708.8
'7-2'    AX      632.0    AY      526.7    AZ      0.001     -
         IX      3370.7   IY      842.7    IZ      1314770.7
'7-3'    AX      448.0    AY      373.3    AZ      0.001     -
         IX      2389.3   IY      597.3    IZ      468309.3
'7-4'    AX      1264.0   AY      1053.3   AZ      0.001     -
         IX      6741.3   IY      1685.3   IZ      10518165.3
'7-5'    AX      576.0    AY      480.0    AZ      0.001     -
         IX      3072.0   IY      768.0    IZ      995328.0
'7.5-1'  AX      251.3    AY      209.4    AZ      0.001     -
         IX      753.8    IY      188.4    IZ      146856.9
$
'8.3-1'  AX      224.0    AY      186.7    AZ      0.001    IX      1194.7   IY      298.7    IZ      58538.7
'8.3-a'  AX      118.0    AY      98.3     AZ      0.001    IX      629.3    IY      157.3    IZ      8557.5
'8.3-b'  AX      44.0     AY      36.7     AZ      0.001    IX      234.7    IY      58.7     IZ      443.7
$
'8.3-2'  AX      576.0    AY      480.0    AZ      0.001     -
         IX      3072.0   IY      768.0    IZ      995328.0
'8.3-3'  AX      576.0    AY      480.0    AZ      0.001     -
         IX      3072.0   IY      768.0    IZ      995328.0
'8.3-4'  AX      124.0    AY      124.3    AZ      0.001     -
         IX      661.3    IY      165.3    IZ      9930.3
$
'9-1'    AX      796.0    AY      663.3    AZ      0.001    IX      4245.3   IY      1061.3   IZ      2626866.3
'9-a'    AX      292.0    AY      243.3    AZ      0.001    IX      1557.3   IY      389.3    IZ      129672.3
'9-b'    AX      420.0    AY      350.0    AZ      0.001    IX      2240.0   IY      560.0    IZ      385875.0
'9-c'    AX      32.0     AY      26.7     AZ      0.001    IX      170.7    IY      42.7     IZ      170.7
$
'9-2'    AX      300.0    AY      250.0    AZ      0.001     -
         IX      2500.0   IY      625.0    IZ      90000.0
'9-3'    AX      1196.0   AY      996.7    AZ      0.001     -
         IX      6378.7   IY      1594.7   IZ      8910299.7
'9-4'    AX      1196.0   AY      996.7    AZ      0.001     -
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        IX      6378.7   IY      1594.7   IZ      8910299.7
$
'10-1'  AX      1007.0   AY      839.2    AZ      0.001    IX      5370.7   IY      1342.7   IZ      5318475.7
'10-a'  AX      71.0     AY      59.2     AZ      0.001    IX      378.7    IY      94.7     IZ      1864.1
'10-b'  AX      194.0    AY      161.7    AZ      0.001    IX      1034.7   IY      258.7    IZ      38028.0
'10-c'  AX      480.0    AY      400.0    AZ      0.001    IX      2560.0   IY      640.0    IZ      576000.0
'10-d'  AX      200.0    AY      166.7    AZ      0.001    IX      1066.7   IY      266.7    IZ      41666.7
'10-2'  AX      216.0    AY      180.0    AZ      0.001    IX      1152.0   IY      288.0    IZ      52488.0
'10-e'  AX      62.0     AY      51.7     AZ      0.001    IX      330.7    IY      82.7     IZ      1241.3
'10-f'  AX      90.0     AY      75.0     AZ      0.001    IX      480.0    IY      120.0    IZ      3796.9
'10-g'  AX      32.0     AY      26.7     AZ      0.001    IX      170.7    IY      42.7     IZ      170.7
$
'10-3'  AX      300.0    AY      250.0    AZ      0.001    -
        IX      2500.0   IY      625.0    IZ      90000.0
'10-4'  AX      337.0    AY      280.8    AZ      0.001    -
        IX      1797.3   IY      449.3    IZ      199337.3
'10-5'  AX      1196.0   AY      996.7    AZ      0.001    -
        IX      6378.7   IY      1594.7   IZ      8910299.7
'10-6'  AX      337.0    AY      280.8    AZ      0.001    -
        IX      1797.3   IY      449.3    IZ      199337.3
'10-7'  AX      1196.0   AY      996.7    AZ      0.001    -
        IX      6378.7   IY      1594.7   IZ      8910299.7
'9.5-1' AX      775.0    AY      645.8    AZ      0.001    -
        IX      4133.3   IY      1033.3   IZ      2424397.8
'11-1'  AX      159.0    AY      132.5    AZ      0.001    -
        IX      477.0    IY      119.3    IZ      37219.3
$
'11-2'  AX      222.0    AY      185.0    AZ      0.001    IX      666.0    IY      166.5    IZ      101306.0
'11-a'  AX      22.5     AY      18.8     AZ      0.001    IX      67.5     IY      16.9     IZ      105.5
'11-b'  AX      175.5    AY      146.3    AZ      0.001    IX      526.5    IY      131.6    IZ      50050.4
'11-3'  AX      162.0    AY      135.0    AZ      0.001    IX      486.0    IY      121.5    IZ      39366.0
'11-c'  AX      40.5     AY      33.8     AZ      0.001    IX      121.5    IY      30.4     IZ      615.1
'11-d'  AX      106.5    AY      88.8     AZ      0.001    IX      319.5    IY      79.9     IZ      11184.7
$
'11-4'  AX      102.0    AY      85.0     AZ      0.001    -
        IX      306.0    IY      76.5     IZ      9826.0
'11-5'  AX      293.3    AY      244.4    AZ      0.001    -
        IX      879.8    IY      219.9    IZ      233501.8
'11-6'  AX      813.0    AY      647.2    AZ      0.001    -
        IX      2034.0   IY      508.5    IZ      4975627.8
'11-7'  AX      813.0    AY      677.5    AZ      0.001    -
        IX      2439.0   IY      609.8    IZ      4975627.8
'11-8'  AX      45.0     AY      28.3     AZ      0.001    -
        IX      58.5     IY      14.6     IZ      843.8
'12-1'  AX      208.5    AY      161.2    AZ      0.001    -
        IX      477.0    IY      119.3    IZ      37219.3
$
'12-2'  AX      162.0    AY      135.0    AZ      0.001    IX      486.0    IY      121.5    IZ      39366.0
'12-a'  AX      18.0     AY      15.0     AZ      0.001    IX      54.0     IY      13.5     IZ      54.0
'12-b'  AX      96.0     AY      80.0     AZ      0.001    IX      288.0    IY      72.0     IZ      8192.0
$
'12-3'  AX      102.0    AY      85.0     AZ      0.001    -
        IX      306.0    IY      76.5     IZ      9826.0
'12.1-1' AX     58.0     AY      48.3     AZ      0.001    -
        IX      309.3    IY      77.3     IZ      1016.2
'12.1-2' AX     58.0     AY      48.3     AZ      0.001    -
        IX      309.3    IY      77.3     IZ      1016.2
'12.1-3' AX     172.0    AY      143.3    AZ      0.001    -
        IX      917.3    IY      229.3    IZ      26502.3
'12.1-4' AX     172.0    AY      143.3    AZ      0.001    -
        IX      917.3    IY      229.3    IZ      26502.3
$
'13-1'  AX      982.5    AY      818.8    AZ      0.001    IX      11790.0  IY      2947.5   IZ      2195401.4
'13-a'  AX      489.0    AY      407.5    AZ      0.001    IX      5868.0   IY      1467.0   IZ      270671.7
'13-b'  AX      441.0    AY      367.5    AZ      0.001    IX      5292.0   IY      1323.0   IZ      198532.7
'13-2'  AX      441.0    AY      367.5    AZ      0.001    IX      5292.0   IY      1323.0   IZ      198532.7
'13-3'  AX      327.0    AY      272.5    AZ      0.001    IX      3924.0   IY      981.0    IZ      80939.3
'13-c'  AX      84.0     AY      70.0     AZ      0.001    IX      1008.0   IY      252.0    IZ      1372.0
'13-d'  AX      192.0    AY      160.0    AZ      0.001    IX      2304.0   IY      576.0    IZ      16384.0
'13-4'  AX      838.5    AY      698.8    AZ      0.001    IX      10062.0  IY      2515.5   IZ      1364663.1
'13-e'  AX      204.0    AY      170.0    AZ      0.001    IX      2448.0   IY      612.0    IZ      19652.0
'13-f'  AX      586.5    AY      488.8    AZ      0.001    IX      7038.0   IY      1759.5   IZ      467003.7
$
'13-5'  AX      2234.3   AY      1850.6   AZ      0.001    -
        IX      14701.5  IY      3675.4   IZ      45897499.5
'13-6'  AX      1489.5   AY      1229.4   AZ      0.001    -
        IX      4293.0   IY      1073.3   IZ      30598333.0
'A-1'   AX      2697.0   AY      2247.5   AZ      0.001    IX      32364.0  IY      8091.0   IZ      45410793.7
'A-a'   AX      685.5    AY      571.3    AZ      0.001    IX      8226.0   IY      2056.5   IZ      745656.2
'A-b'   AX      481.5    AY      401.3    AZ      0.001    IX      5778.0   IY      1444.5   IZ      258407.5
'A-c'   AX      1330.5   AY      1108.8   AZ      0.001    IX      15966.0  IY      3991.5   IZ      5452063.3
'A-2'   AX      2009.3   AY      1669.0   AZ      0.001    -
        IX      13380.2  IY      3345.0   IZ      33380716.7
'A-3'   AX      1339.5   AY      1112.7   AZ      0.001    -
        IX      3964.5   IY      991.1    IZ      22253811.2
'B-1'   AX      208.0    AY      173.3    AZ      0.001    -
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	IX	1109.3	IY	277.3	IZ	46869.3						
'B-2'	AX	208.0	AY	173.3	AZ	0.001	-					
	IX	1109.3	IY	277.3	IZ	46869.3						
'D-1'	AX	1104.0	AY	920.0	AZ	0.001	IX	5888.0	IY	1472.0	IZ	7008192.0
'D-a'	AX	520.0	AY	433.3	AZ	0.001	IX	2773.3	IY	693.3	IZ	732333.3
'D-b'	AX	124.0	AY	103.3	AZ	0.001	IX	661.3	IY	165.3	IZ	9930.3
'D-c'	AX	272.0	AY	226.7	AZ	0.001	IX	1450.7	IY	362.7	IZ	104810.7
'D-2'	AX	426.0	AY	352.2	AZ	0.001	-					
	IX	2197.3	IY	549.3	IZ	402649.9						
'D-3'	AX	160.0	AY	133.3	AZ	0.001	-					
	IX	853.3	IY	213.3	IZ	21333.3						
'D-4'	AX	234.0	AY	191.3	AZ	0.001	-					
	IX	648.0	IY	162.0	IZ	118638.0						
'D-5'	AX	160.0	AY	133.3	AZ	0.001	-					
	IX	853.3	IY	213.3	IZ	21333.3						
'D-6'	AX	234.0	AY	195.0	AZ	0.001	-					
	IX	702.0	IY	175.5	IZ	118638.0						
'D-7'	AX	148.0	AY	123.3	AZ	0.001	-					
	IX	789.3	IY	197.3	IZ	16884.3						
'D-8'	AX	136.0	AY	113.3	AZ	0.001	-					
	IX	725.3	IY	181.3	IZ	13101.3						
'D.5-1'	AX	64.0	AY	53.3	AZ	0.001	-					
	IX	341.3	IY	85.3	IZ	1365.3						
'D.5-2'	AX	152.0	AY	126.7	AZ	0.001	-					
	IX	810.7	IY	202.7	IZ	18290.7						
'E-1'	AX	248.0	AY	199.3	AZ	0.001	-					
	IX	1152.0	IY	288.0	IZ	52488.0						
'E-2'	AX	613.0	AY	510.8	AZ	0.001	IX	3269.3	IY	817.3	IZ	1199720.8
'E-a'	AX	214.0	AY	178.3	AZ	0.001	IX	1141.3	IY	285.3	IZ	51043.5
'E-b'	AX	320.0	AY	266.7	AZ	0.001	IX	1706.7	IY	426.7	IZ	170666.7
'E-3'	AX	607.0	AY	471.1	AZ	0.001	-					
	IX	2714.7	IY	678.7	IZ	1164836.2						
'E-4'	AX	455.3	AY	379.4	AZ	0.001	-					
	IX	1365.8	IY	341.4	IZ	873627.1						
'F-1'	AX	248.0	AY	175.3	AZ	0.001	-					
	IX	938.7	IY	234.7	IZ	79442.7						
'F-2'	AX	418.0	AY	340.1	AZ	0.001	-					
	IX	2112.0	IY	528.0	IZ	323433.0						
'G-1'	AX	248.0	AY	175.3	AZ	0.001	-					
	IX	938.7	IY	234.7	IZ	79442.7						
'G-2'	AX	612.0	AY	510.0	AZ	0.001	-					
	IX	3264.0	IY	816.0	IZ	1193859.0						
'G-3'	AX	281.0	AY	234.2	AZ	0.001	-					
	IX	1498.7	IY	374.7	IZ	115562.7						
'G-4'	AX	409.0	AY	327.4	AZ	0.001	-					
	IX	1936.0	IY	484.0	IZ	249125.8						
'G-5'	AX	409.0	AY	340.8	AZ	0.001	-					
	IX	2181.3	IY	545.3	IZ	356343.4						
'H-1'	AX	248.0	AY	199.3	AZ	0.001	-					
	IX	1152.0	IY	288.0	IZ	52488.0						
'H-2'	AX	610.0	AY	500.1	AZ	0.001	-					
	IX	3136.0	IY	784.0	IZ	1058841.0						
'H-3'	AX	112.0	AY	93.3	AZ	0.001	-					
	IX	597.3	IY	149.3	IZ	7317.3						
'H-4'	AX	157.5	AY	110.9	AZ	0.001	-					
	IX	319.5	IY	79.9	IZ	11184.7						
'H-5'	AX	112.0	AY	93.3	AZ	0.001	-					
	IX	597.3	IY	149.3	IZ	7317.3						
'H-6'	AX	157.5	AY	131.3	AZ	0.001	-					
	IX	472.5	IY	118.1	IZ	36175.8						
'H.75-1'	AX	248.0	AY	199.3	AZ	0.001	-					
	IX	1152.0	IY	288.0	IZ	52488.0						
'J-1'	AX	100.0	AY	83.3	AZ	0.001	-					
	IX	533.3	IY	133.3	IZ	5208.3						
'J-2'	AX	455.0	AY	379.2	AZ	0.001	IX	2426.7	IY	606.7	IZ	490606.1
'J-c'	AX	24.0	AY	20.0	AZ	0.001	IX	128.0	IY	32.0	IZ	72.0
'J-d'	AX	365.0	AY	304.2	AZ	0.001	IX	1946.7	IY	486.7	IZ	253266.3
'J-3'	AX	411.0	AY	332.2	AZ	0.001	-					
	IX	1936.0	IY	484.0	IZ	249125.8						
'J-4'	AX	411.0	AY	342.5	AZ	0.001	-					
	IX	2192.0	IY	548.0	IZ	361596.5						
'J-5'	AX	136.0	AY	113.3	AZ	0.001	IX	725.3	IY	181.3	IZ	13101.3
'J-a'	AX	68.0	AY	56.7	AZ	0.001	IX	362.7	IY	90.7	IZ	1637.7
'J-b'	AX	52.0	AY	43.3	AZ	0.001	IX	277.3	IY	69.3	IZ	732.3
'J-6'	AX	136.0	AY	113.3	AZ	0.001	-					
	IX	725.3	IY	181.3	IZ	13101.3						
'J-7'	AX	136.0	AY	113.3	AZ	0.001	-					
	IX	725.3	IY	181.3	IZ	13101.3						
'J.4-1'	AX	248.0	AY	175.3	AZ	0.001	-					
	IX	938.7	IY	234.7	IZ	79442.7						
'J.9-1'	AX	248.0	AY	175.3	AZ	0.001	-					
	IX	938.7	IY	234.7	IZ	79442.7						
'K-1'	AX	75.0	AY	62.5	AZ	0.001	-					
	IX	225.0	IY	56.3	IZ	3906.3						
'K-2'	AX	42.0	AY	35.0	AZ	0.001	-					
	IX	126.0	IY	31.5	IZ	686.0						

'K-3'	AX	105.0	AY	87.5	AZ	0.001	-					
	IX	315.0	IY	78.8	IZ	10718.8						
'K-4'	AX	303.8	AY	246.4	AZ	0.001	-					
	IX	816.8	IY	204.2	IZ	186844.3						
'K-5'	AX	303.8	AY	253.1	AZ	0.001	-					
	IX	911.3	IY	227.8	IZ	259492.7						
'K.5-1'	AX	248.0	AY	199.3	AZ	0.001	-					
	IX	1152.0	IY	288.0	IZ	52488.0						
'K.5-2'	AX	160.0	AY	122.4	AZ	0.001	-					
	IX	629.3	IY	157.3	IZ	8557.5						
'K.8-1'	AX	112.0	AY	93.3	AZ	0.001	-					
	IX	597.3	IY	149.3	IZ	7317.3						
'K.8-2'	AX	314.0	AY	261.7	AZ	0.001	-					
	IX	1674.7	IY	418.7	IZ	161245.5						
'L-1'	AX	611.0	AY	509.2	AZ	0.001	IX	3258.7	IY	814.7	IZ	1188016.3
'L-a'	AX	167.0	AY	139.2	AZ	0.001	IX	890.7	IY	222.7	IZ	24257.6
'L-b'	AX	364.0	AY	303.3	AZ	0.001	IX	1941.3	IY	485.3	IZ	251190.3
'L-2'	AX	308.3	AY	250.5	AZ	0.001	-					
	IX	839.3	IY	209.8	IZ	202715.3						
'L-3'	AX	605.0	AY	504.2	AZ	0.001	-					
	IX	3226.7	IY	806.7	IZ	1153360.0						
'L-4'	AX	303.8	AY	247.1	AZ	0.001	-					
	IX	825.8	IY	206.4	IZ	193089.3						
'L-5'	AX	252.0	AY	210.0	AZ	0.001	-					
	IX	756.0	IY	189.0	IZ	148176.0						
'L-6'	AX	303.8	AY	237.6	AZ	0.001	-					
	IX	713.3	IY	178.3	IZ	124433.6						
'L-7'	AX	234.0	AY	195.0	AZ	0.001	-					
	IX	702.0	IY	175.5	IZ	118638.0						
'M-1'	AX	90.0	AY	75.0	AZ	0.001	-					
	IX	270.0	IY	67.5	IZ	6750.0						
'M-2'	AX	75.0	AY	62.5	AZ	0.001	-					
	IX	225.0	IY	56.3	IZ	3906.3						
'M-3'	AX	156.0	AY	130.0	AZ	0.001	-					
	IX	468.0	IY	117.0	IZ	35152.0						
'M.3-1'	AX	158.0	AY	131.7	AZ	0.001	-					
	IX	842.7	IY	210.7	IZ	20543.3						
'M.3-2'	AX	180.0	AY	139.9	AZ	0.001	-					
	IX	832.0	IY	208.0	IZ	19773.0						
'N-1'	AX	753.0	AY	627.5	AZ	0.001	IX	4016.0	IY	1004.0	IZ	2223738.4
'N-a'	AX	307.0	AY	255.8	AZ	0.001	IX	1637.3	IY	409.3	IZ	150700.2
'N-b'	AX	185.0	AY	154.2	AZ	0.001	IX	986.7	IY	246.7	IZ	32977.2
'N-c'	AX	145.0	AY	120.8	AZ	0.001	IX	773.3	IY	193.3	IZ	15878.3
'N-2'	AX	284.0	AY	236.7	AZ	0.001	-					
	IX	1514.7	IY	378.7	IZ	119303.7						
'N-3'	AX	100.0	AY	83.3	AZ	0.001	-					
	IX	533.3	IY	133.3	IZ	5208.3						
'N-4'	AX	455.0	AY	379.2	AZ	0.001	IX	2426.7	IY	606.7	IZ	490606.1
'N-d'	AX	368.0	AY	306.7	AZ	0.001	IX	1962.7	IY	490.7	IZ	259562.7
'N-e'	AX	59.0	AY	49.2	AZ	0.001	IX	314.7	IY	78.7	IZ	1069.7
'N-5'	AX	605.0	AY	504.2	AZ	0.001	-					
	IX	3226.7	IY	806.7	IZ	1153360.0						
'N-6'	AX	949.0	AY	853.2	AZ	0.001	-					
	IX	5061.3	IY	1265.3	IZ	2034994.1						
'N-7'	AX	175.0	AY	145.8	AZ	0.001	-					
	IX	933.3	IY	233.3	IZ	27913.4						
'N-8'	AX	1109.0	AY	924.2	AZ	0.001	-					
	IX	5914.7	IY	1478.7	IZ	7103843.9						
'O-1'	AX	619.0	AY	515.8	AZ	0.001	IX	3301.3	IY	825.3	IZ	1235295.1
'O-a'	AX	177.0	AY	147.5	AZ	0.001	IX	944.0	IY	236.0	IZ	28881.4
'O-b'	AX	262.0	AY	218.3	AZ	0.001	IX	1397.3	IY	349.3	IZ	93670.5
'O-c'	AX	134.0	AY	111.7	AZ	0.001	IX	714.7	IY	178.7	IZ	12531.8
'O-2'	AX	605.0	AY	504.2	AZ	0.001	IX	3226.7	IY	806.7	IZ	1153360.0
'O-d'	AX	473.0	AY	394.2	AZ	0.001	IX	2522.7	IY	630.7	IZ	551165.7
'O-e'	AX	100.0	AY	83.3	AZ	0.001	IX	533.3	IY	133.3	IZ	5208.3
'O-3'	AX	455.0	AY	379.2	AZ	0.001	-					
	IX	2426.7	IY	606.7	IZ	490606.1						
'O-4'	AX	149.0	AY	107.2	AZ	0.001	-					
	IX	474.7	IY	118.7	IZ	3671.7						
'O-5'	AX	1593.0	AY	1312.9	AZ	0.001	-					
	IX	8112.0	IY	2028.0	IZ	21054556.5						
'O-6'	AX	1293.0	AY	1077.5	AZ	0.001	-					
	IX	6896.0	IY	1724.0	IZ	11258858.1						
'P-1'	AX	348.8	AY	290.6	AZ	0.001	IX	1046.3	IY	261.6	IZ	392752.4
'P-a'	AX	43.5	AY	36.3	AZ	0.001	IX	130.5	IY	32.6	IZ	762.2
'P-b'	AX	196.5	AY	163.8	AZ	0.001	IX	589.5	IY	147.4	IZ	70252.8
'P-c'	AX	63.0	AY	52.5	AZ	0.001	IX	189.0	IY	47.3	IZ	2315.3
'R-1'	AX	928.5	AY	773.8	AZ	0.001	IX	11142.0	IY	2785.5	IZ	1852942.6
'R-a'	AX	139.5	AY	116.3	AZ	0.001	IX	1674.0	IY	418.5	IZ	6284.0
'R-b'	AX	505.5	AY	421.3	AZ	0.001	IX	6066.0	IY	1516.5	IZ	299005.9
'R-c'	AX	193.5	AY	161.3	AZ	0.001	IX	2322.0	IY	580.5	IZ	16771.0
'R-2'	AX	906.0	AY	755.0	AZ	0.001	IX	10872.0	IY	2718.0	IZ	1721475.5
'R-d'	AX	198.0	AY	165.0	AZ	0.001	IX	2376.0	IY	594.0	IZ	17968.5
'R-e'	AX	408.0	AY	340.0	AZ	0.001	IX	4896.0	IY	1224.0	IZ	157216.0
'R-f'	AX	150.0	AY	125.0	AZ	0.001	IX	1800.0	IY	450.0	IZ	7812.5
'R-3'	AX	682.5	AY	568.8	AZ	0.001	-					

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        IX      8190.0   IY      2047.5   IZ      735909.2
'R-4'   AX      2009.3   AY      1664.5   AZ      0.001     -
        IX      13228.3  IY      3307.1   IZ      33380716.7
'R-5'   AX      1339.5   AY      1062.4   AZ      0.001     -
        IX      3919.5   IY      979.9    IZ      22253811.2
'dummy 1'       AX      0.001    AY      0.001    AZ      0.001     -
        IX      0.001    IY      0.001    IZ      0.001
'dummy 2'       AX      0.001    AY      0.001    AZ      0.001     -
        IX      0.001    IY      0.001    IZ      0.001
'dummy 3'       AX      0.001    AY      0.001    AZ      0.001     -
        IX      0.001    IY      0.001    IZ      0.001
'dummy 4'       AX      0.001    AY      0.001    AZ      0.001     -
        IX      0.001    IY      0.001    IZ      0.001
$
TYPE    RIGID   SOLID
RIGID   BODY    INCIDENCES
100     EXISTING   4 6 TO 12 14 TO 18 21 24 TO 26 29 30 31 33 35 39 41 42 44 TO 47 49 TO 52 -
54 TO 61 63 65 66 69 70 74 78 TO 87 99           1000 TO 1076     MASTER  100     $ Base slab
200     EXISTING   101 TO 187     201 TO 238 199   MASTER  200     $ EL. 31.5
400     301 TO 338 401 TO 429     399     MASTER  400     $ EL. 65.5
600     501 TO 529 601 TO 604     599     MASTER  600     $ EL. 99.5
700     701 TO 704                MASTER  700     $ EL. 106.5
$
1       2000 TO 2005     MASTER  1       $ WALL 1.0
2       2006 TO 2010     MASTER  2       $ WALL 3.0
3       2011 TO 2015     MASTER  3       $ WALL 3.5
4       2016 TO 2017     MASTER  5       $ WALL 4.0
5       2018 TO 2019     MASTER  13      $ WALL 5.0
6       2020 TO 2021     MASTER  19      $ WALL 8.3
7       2022 TO 2024     MASTER  20      $ WALL 9.0
8       2025 TO 2028     MASTER  22      $ WALL 10.0
9       2029 TO 2031     MASTER  23      $ WALL 10.0
10      2032 TO 2033     MASTER  27      $ WALL 11.0
11      2034 TO 2035     MASTER  28      $ WALL 11.0
12      2036 TO 2037     MASTER  32      $ WALL 12.0
13      2038 TO 2039     MASTER  34      $ WALL 13.0
14      2040 TO 2041     MASTER  36      $ WALL 13.0
15      2042 TO 2043     MASTER  37      $ WALL 13.0
$
16      2044 TO 2046     MASTER  38      $ WALL A.0
17      2047 TO 2049     MASTER  40      $ WALL D.0
18      2050 TO 2051     MASTER  43      $ WALL E.0
19      2052 TO 2053     MASTER  48      $ WALL J.0
20      2054 TO 2055     MASTER  53      $ WALL J.0
21      2056 TO 2057     MASTER  62      $ WALL L.0
22      2058 TO 2060     MASTER  68      $ WALL N.0
23      2061 TO 2062     MASTER  71      $ WALL N.0
24      2063 TO 2065     MASTER  72      $ WALL O.0
25      2066 TO 2067     MASTER  73      $ WALL O.0
26      2068 TO 2070     MASTER  75      $ WALL P.0
27      2071 TO 2073     MASTER  76      $ WALL R.0
28      2074 TO 2076     MASTER  77      $ WALL R.0
$
INERTIA OF JOINTS WEIGHT GRAVITY 32.2
99      TRANS X  366043.3 Y       366043.3 Z       366043.3 $ Base Slab Mass
199     TRANS X  230658.4 Y       230658.4 Z       230658.4 $ Mass at 31.5
399     TRANS X  174027.9 Y       174027.9 Z       174027.9 $ Mass at 65.5
599     TRANS X  110761.4 Y       110761.4 Z       110761.4 $ Mass at 99.5
700     TRANS X  6098.0   Y       6098.0   Z       6098.0   $ Mass at 106.5
$
INERTIA OF JOINTS MASS
99      ROT X    2.04E+08 Y       1.79E+08 Z       3.82E+08 $ Mass Moment of Inertia at 0.0
199     ROT X    1.18E+08 Y       1.07E+08 Z       2.25E+08 $ Mass Moment of Inertia at 31.5
399     ROT X    9.55E+07 Y       8.45E+07 Z       1.80E+08 $ Mass Moment of Inertia at 65.5
599     ROT X    6.55E+07 Y       5.29E+07 Z       1.18E+08 $ Mass Moment of Inertia at 99.5
700     ROT X    8.27E+05 Y       1.07E+05 Z       9.33E+05 $ Mass Moment of Inertia at 106.5
$
STATUS  SUPPORT JOINTS  100
UNITS   RADIANS
JOINT RELEASES
$ LOWER BOUND 35 ALLUVIUM SOIL SPRINGS
$100    KFX     1.65E+07 KFY     1.74E+07 KFZ     2.01E+07  -
$       KMX     1.23E+12 KMY     9.86E+11 KMZ     1.45E+12
$ MEDIAN 35 ALLUVIUM SOIL SPRINGS
$100    KFX     3.71E+07 KFY     3.90E+07 KFZ     4.50E+07  -
$       KMX     2.75E+12 KMY     2.21E+12 KMZ     3.25E+12
$  UPPER BOUND 35 ALLUVIUM SPRINGS
$100    KFX     7.68E+07 KFY     8.09E+07 KFZ     9.33E+07  -
$       KMX     5.71E+12 KMY     4.58E+12 KMZ     6.74E+12
$ LOWER BOUND 110 ALLUVIUM SPRINGS
$100    KFX     1.23E+07 KFY     1.30E+07 KFZ     1.50E+07  -
$       KMX     9.15E+11 KMY     7.34E+11 KMZ     1.08E+12
$ MEDIAN 110 ALLUVIUM SOIL SPRINGS
$100    KFX     2.93E+07 KFY     3.09E+07 KFZ     3.56E+07  -
$       KMX     2.18E+12 KMY     1.75E+12 KMZ     2.57E+12
$ UPPER BOUND 110 ALLUVIUM SOIL SPRINGS
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$100     KFX      6.87E+07 KFY      7.24E+07 KFZ      8.35E+07 -
$        KMX      5.11E+12 KMY      4.10E+12 KMZ      6.03E+12
$
LOADING 1 'LUMPED JOINT DEAD LOAD -Z VERTICAL DIRECTION'
JOINT LOAD
99       FORCE    Z        -366043.3
199      FORCE    Z        -230658.4
399      FORCE    Z        -174027.9
599      FORCE    Z        -110761.4
700      FORCE    Z        -6098.0
$
UNITS    CYCLES
EIGEN PARAMETERS
SOLVE USING GTLANCZOS
FREQUENCY SPECIFICATIONS 0.0 TO 100.0
PRINT MAX
END
PERFORM ASSEMBLY FOR DYNAMICS
PERFORM EIGENVALUE ANALYSIS
$ LIST DYNAMIC EIGENVALUES
LIST DYNAMIC PARTICIPATION FACTORS
LIST DYNAMIC MASS SUMMARY
$
INACTIVE MEMBERS 100 200 400 600 700 1 TO 28
$
$        5e-4 Point D/E Horizontal 20% Damped Seismic Design Response Spectrum
$        Frequency(Hz) Spectral Acceleration (g)
$
UNITS    FEET     SECONDS  CYCLES
$ 20% CRITICAL DAMPING for the first three modes
STORE RESPONSE SPECTRUM ACCELERATION LOG VS NATURAL FREQUENCY LOG 'HORIZ'

         DAMPING RATIO 0.07 FACTOR 32.17
         0.0101   0.10
         0.0405   0.20
         0.0567   0.250
         0.0869   0.33
         0.1503   0.50
         0.2151   0.67
         0.3525   1.00
         0.4310   1.18
         0.4988   1.33
         0.6463   1.67
         0.7451   2.00
         0.7927   2.17
         0.8731   2.50
         0.9068   2.78
         0.9684   3.33
         1.0325   4.17
         1.0606   5.00
         1.0862   5.88
         1.1075   6.67
         1.1273   8.33
         1.1489   10.00
         1.1615   11.11
         1.1318   13.33
         1.0854   16.67
         1.0399   20.00
         0.9562   25.00
         0.8589   33.33
         0.7287   50.00
         0.5802   100.00
         DAMPING RATIO 0.20 FACTOR 32.17
         0.0073   0.10
         0.0292   0.20
         0.0401   0.250
         0.0603   0.33
         0.1021   0.50
         0.1448   0.67
         0.2359   1.00
         0.2884   1.18
         0.3339   1.33
         0.4327   1.67
         0.4988   2.00
         0.5307   2.17
         0.5845   2.50
         0.6071   2.78
         0.6483   3.33
         0.6912   4.17
         0.7100   5.00
         0.7272   5.88
         0.7535   6.67
         0.7855   8.33
         0.8307   10.00
         0.8579   11.11
         0.8670   13.33
```

```
        0.8697   16.67
        0.8646   20.00
        0.8315   25.00
        0.7947   33.33
        0.7287   50.00
        0.5802   100.00
END OF RESPONSE SPECTRUM
$
$       5e-4 Point D/E Vertical 20% Damped Seismic Design Response Spectrum

$       Frquency(Hz) Spectral Acceleration (g)
$
$ 20% CRITICAL DAMPING for the first three modes
STORE RESPONSE SPECTRUM ACCELERATION LOG VS NATURAL FREQUENCY LOG 'VERT'

        DAMPING RATIO  0.07 FACTOR 32.17
        0.0100   0.10
        0.0328   0.20
        0.0432   0.25
        0.0616   0.33
        0.0937   0.50
        0.1227   0.67
        0.1762   1.00
        0.2033   1.18
        0.2271   1.33
        0.2775   1.67
        0.3282   2.00
        0.3545   2.17
        0.4031   2.50
        0.4401   2.78
        0.5112   3.33
        0.6125   4.17
        0.6943   5.00
        0.7657   5.88
        0.8271   6.67
        0.8782   8.33
        0.9009   10.00
        0.9176   11.11
        0.9465   13.33
        0.9263   16.67
        0.9013   20.00
        0.8659   25.00
        0.7946   33.33
        0.7126   50.00
        0.5188   100.00
        DAMPING RATIO  0.20 FACTOR 32.17
        0.0072   0.10
        0.0234   0.20
        0.0301   0.25
        0.0419   0.33
        0.0622   0.50
        0.0805   0.67
        0.1148   1.00
        0.1324   1.18
        0.1479   1.33
        0.1808   1.67
        0.2139   2.00
        0.2310   2.17
        0.2627   2.50
        0.2868   2.78
        0.3331   3.33
        0.3960   4.17
        0.4444   5.00
        0.4848   5.88
        0.5219   6.67
        0.5577   8.33
        0.5787   10.00
        0.6014   11.11
        0.6402   13.33
        0.6486   16.67
        0.6508   20.00
        0.6481   25.00
        0.6548   33.33
        0.7126   50.00
        0.5188   100.00
END OF RESPONSE SPECTRUM
$
DAMPING RATIOS 0.20 3, 0.07 27
$
RESPONSE SPECTRUM LOADING 'HX' 'GLOBAL X DIRECTION SPECTRA'
        SUPPORT ACCELERATIONS
        TRANSLATION X FILE 'HORIZ'
END RESPONSE SPECTRA LOAD
$
RESPONSE SPECTRUM LOADING 'HY' 'GLOBAL Y DIRECTION SPECTRA'
        SUPPORT ACCELERATIONS
```

```
        TRANSLATION Y FILE 'HORIZ'
END RESPONSE SPECTRA LOAD
$
RESPONSE SPECTRUM LOADING 'VZ' 'GLOBAL Z DIRECTION SPECTRA'
        SUPPORT ACCELERATIONS
        TRANSLATION Z FILE 'VERT'
END RESPONSE SPECTRA LOAD
$
PERFORM RESPONSE SPECTRA ANALYSIS
$
COMPUTE RESPONSE SPECTRUM ACCELERATIONS MODAL COMBINATION NRC TPM NODES ALL

$
COMPUTE RESPONSE SPECTRA FORCES MODAL COMBINATION NRC TPM  MEMBERS ALL BUT 100 200 400 600 700 1 TO 28

$
COMPUTE RESPONSE SPECTRUM DISPLACEMENTS MODE COMBINATION NRC TPM NODES ALL

$
LIST RESPONSE SPECTRA ACCELERATIONS MODAL COMBINATIONS NRC TPM NODES ALL

$
LIST RESPONSE SPECTRUM FORCES  MODAL COMBINATION NRC TPM MEMBERS ALL BUT 100 200 400 600 700 1 TO 28

$
CREATE PSEUDO STATIC LOAD 'NRCTPM_X' FROM NRC TPM OF  LOADING 'HX'
CREATE PSEUDO STATIC LOAD 'NRCTPM_Y' FROM NRC TPM OF  LOADING 'HY'
CREATE PSEUDO STATIC LOAD 'NRCTPM_Z' FROM NRC TPM OF  LOADING 'VZ'
$
CREATE LOADING COMBINATION 'SRSS_XYZ' TYPE RMS SPEC 'NRCTPM_X' 1.0 'NRCTPM_Y' 1.0 'NRCTPM_Z' 1.0

$
OUTPUT DECIMAL 1
$
LOAD LIST 'SRSS_XYZ'
LIST FORCES MEMBERS EXISTING
$
$ LIST RESPONSE SPECTRA DISPLACEMENTS FOR CALCULATING SUPPORT SPRING REACTIONS

$ MAGNITUDE OF THE DISPLACEMENT/ROTATION TIMES THE SUPPORT SPRING CONSTANT

$
OUTPUT DECIMAL 10
UNITS RADIANS
$ LIST DISPLACEMENTS JOINTS EXISTING  100
$ LOAD LIST ALL
LOAD LIST 'HX' 'HY' 'VZ'
OUTPUT MODAL CONTRIBUTIONS OFF
LIST RESPONSE SPECTRUM DISPLACEMENTS MODE COMBINATION NRC TPM JOINTS -

EXISTING 100
$
OUTPUT DECIMAL 1
$
LOAD LIST 1
STIFFNESS ANALYSIS
$
LIST FORCES MEMBERS EXISTING
$
OUTPUT DECIMAL 10
$
$ LIST STATIC DISPLACEMENTS FOR CALCULATING SUPPORT SPRING REACTIONS

$ MAGNITUDE OF THE DISPLACEMENT/ROTATION TIMES THE SUPPORT SPRING CONSTANT

$
LIST DISPLACEMENTS JOINTS EXISTING  100
$
```

8. RESULTS

The primary outputs of this calculation are:

- All mode shapes between 0.0 and 100.0 hertz
- Mass participation factors for all modes below 100.0 hertz
- Response spectra accelerations
- Response spectra forces for each global direction
- Response spectra forces combined using SRSS
- Dynamic spring displacements
- Dead load forces (includes 25% of the applied live load)
- Static spring displacements

In subsequent calculations, the inertial seismic forces (using the SRSS combination), dead load forces, and nodal accelerations will be used to do preliminary design of the concrete shear walls and diaphragms. There are 27 modes below 100 hertz providing 100% mass participation with no missing modes. The spring support displacements are used to obtain the global support reactions by multiplying each spring displacement or rotation by the corresponding spring constant. A subsequent calculation will use these spring reactions to determine the dynamic soil pressure under the basemat for preliminary design.

The outputs are reasonable based on the inputs. The forces and accelerations increase, as expected, with each increment increase of soil spring stiffness used (e.g. lower bound springs produce lowest forces, upper bound spring yields highest forces).

The outputs are also bounding with respect to their usage. The output used in all subsequent calculations will be based on the upper bound 35 spring support boundary condition. Coupled with the 20% damped spectral accelerations, the upper bound 35 spring support yields the highest (i.e. the most conservative) member forces, nodal accelerations and support displacements, and is considered appropriate for further Tier 1 analysis and design.

9. REFERENCES

BSC (Bechtel SAIC Company) 2003. *Q-List.* TDR-MGR-RL-000005 REV 00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: DOC.20030930.0002.

BSC (Bechtel SAIC Company) 2003. *Users Manual: GT STRUDL Version 26.* 10829-UM-26-00. Las Vegas, Nevada: Bechtel SAIC Company. ACC: MOL.20030521.0191.

BSC (Bechtel SAIC Company) 2004. *Dry Transfer Facility Soil Springs.* 110-CYC-CY00-00100-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20040330.0006.

BSC (Bechtel SAIC Company) 2004. *Dry Transfer Facility Mass and Stiffness Property Calculations.* 110-SYC-SY00-00200-000-00A. Las Vegas, Nevada: Bechtel SAIC Company. ACC: ENG.20040318.0005.

MO0402SDSTMHIS.004. Seismic Design Spectra and Time Histories for the Surface Facilities Area (Point D/E) at 5E-4 Annual Exceedance Frequency.

DOE (U.S. Department of Energy) 2004. *Quality Assurance Requirements and Description.* DOE/RW-0333P, Rev. 14. Washington, D.C.: U.S. Department of Energy, Office of Civilian Radioactive Waste Management. ACC: DOC.20040331.0004.

10. ATTACHMENTS

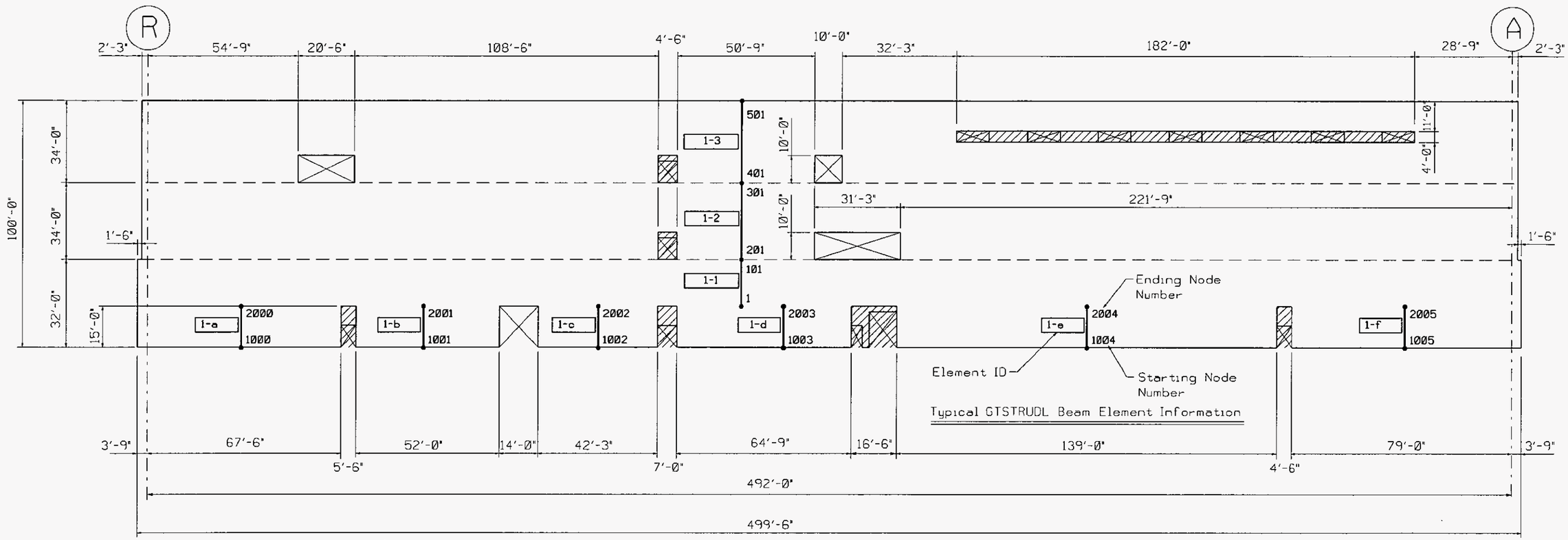
1. GTSTRUDL Output using fixed base boundary condition (CD-ROM)	92
2. GTSTRUDL Output using lower bound 35 soil springs (CD-ROM)	103
3. GTSTRUDL Output using median 35 soil springs (CD-ROM)	103
4. GTSTRUDL Output using upper bound 35 soil springs (CD-ROM)	103
5. GTSTRUDL Output using lower bound 110 soil springs (CD-ROM)	103
6. GTSTRUDL Output using median 110 soil springs (CD-ROM)	103
7. GTSTRUDL Output using upper bound 110 soil springs (CD-ROM)	103
8. Dry Transfer Facility Wall Elevations Beam Stick Model Joints / Elements	32
9. Dry Transfer Facility General Arrangements	1

Attachments 1 through 7 are supplied on a CD-ROM for review. The filenames are as follows:

Attachment 1_GTSTRUDL Output using fixed base boundary condition.doc
Attachment 2_GTSTRUDL Output using lower bound 35 soil springs.doc
Attachment 3_GTSTRUDL Output using median 35 soil springs.doc
Attachment 4_GTSTRUDL Output using upper bound 35 soil springs.doc
Attachment 5_GTSTRUDL Output using lower bound 110 soil springs.doc
Attachment 6_GTSTRUDL Output using median 110 soil springs.doc
Attachment 7_GTSTRUDL Output using upper bound 110 soil springs.doc

ATTACHMENT 8, SHEET 1

• ALL DIMENSIONS ARE +/- SIX INCHES

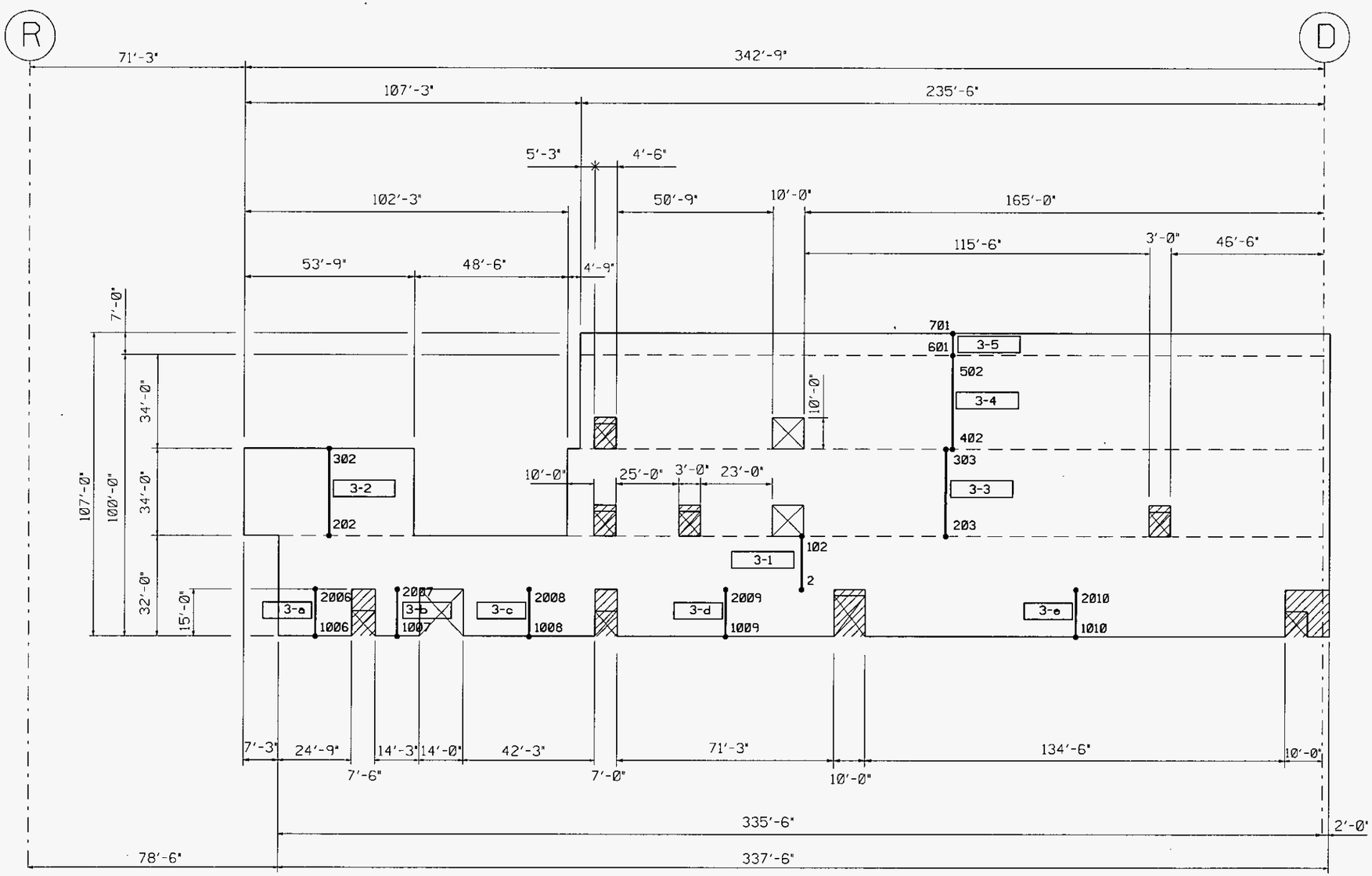


Wall Elevation @ Column Line 1.0

(Looking West)

N.T.S.

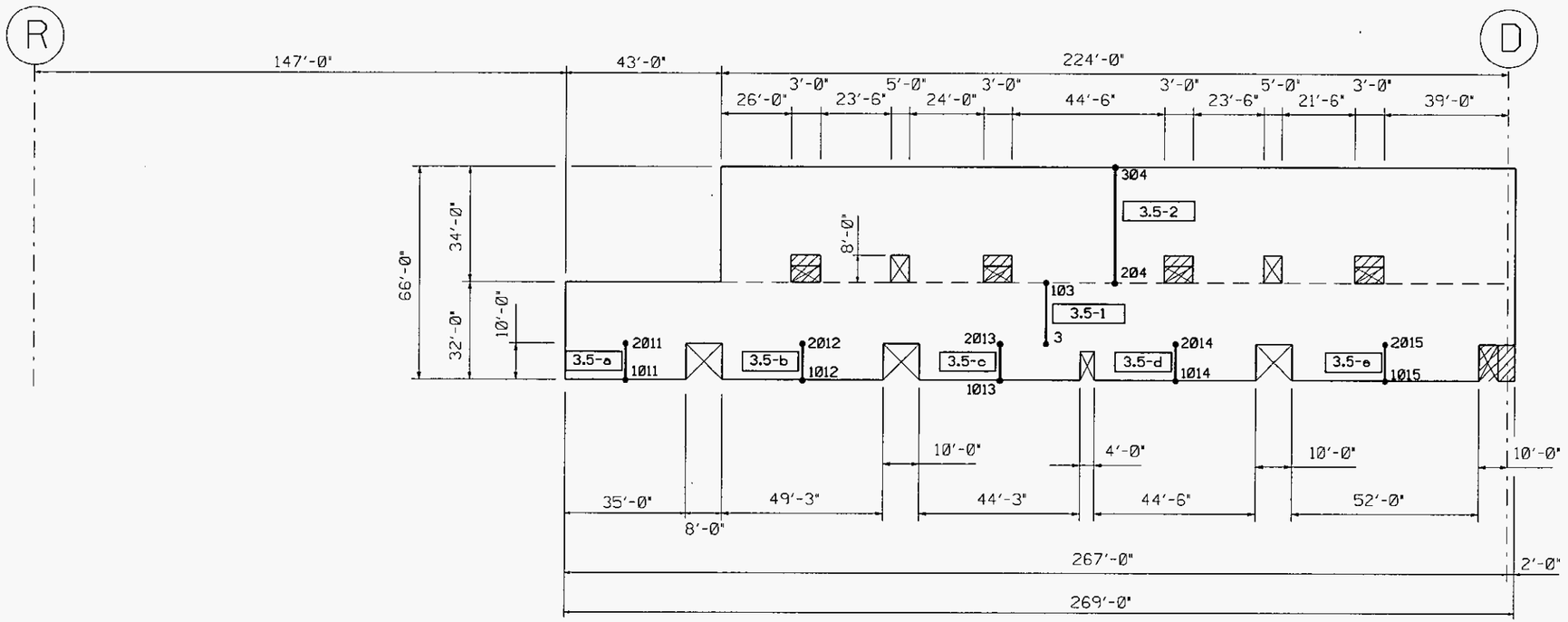
• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 3.0
(Looking West)

N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

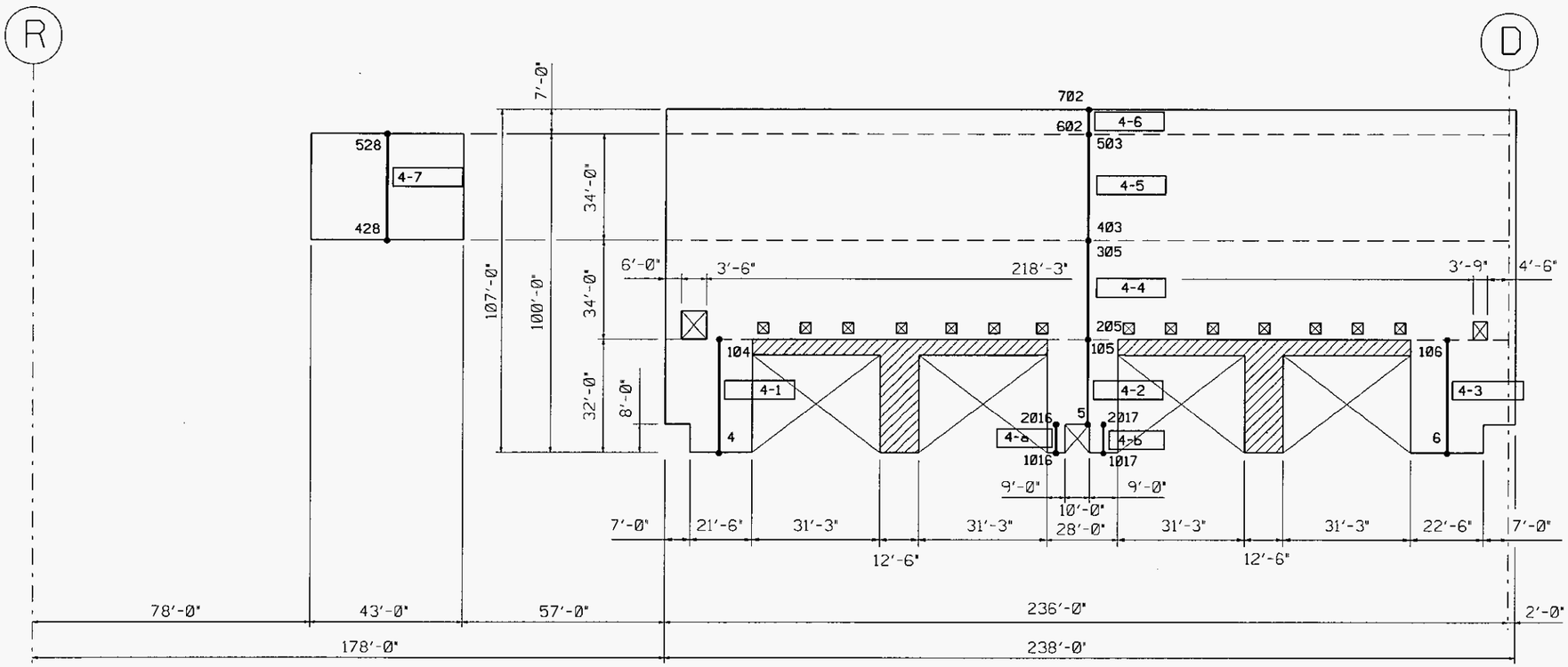


Wall Elevation @ Column Line 3.5

(Looking West)

N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

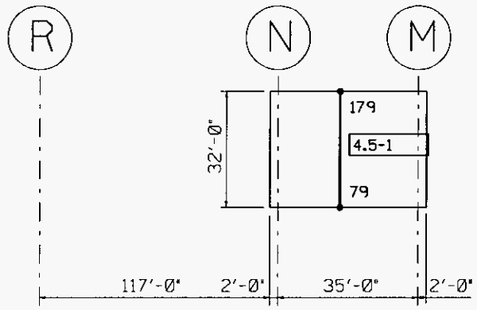


Wall Elevation @ Column Line 4.0

(Looking West)

N.T.S.

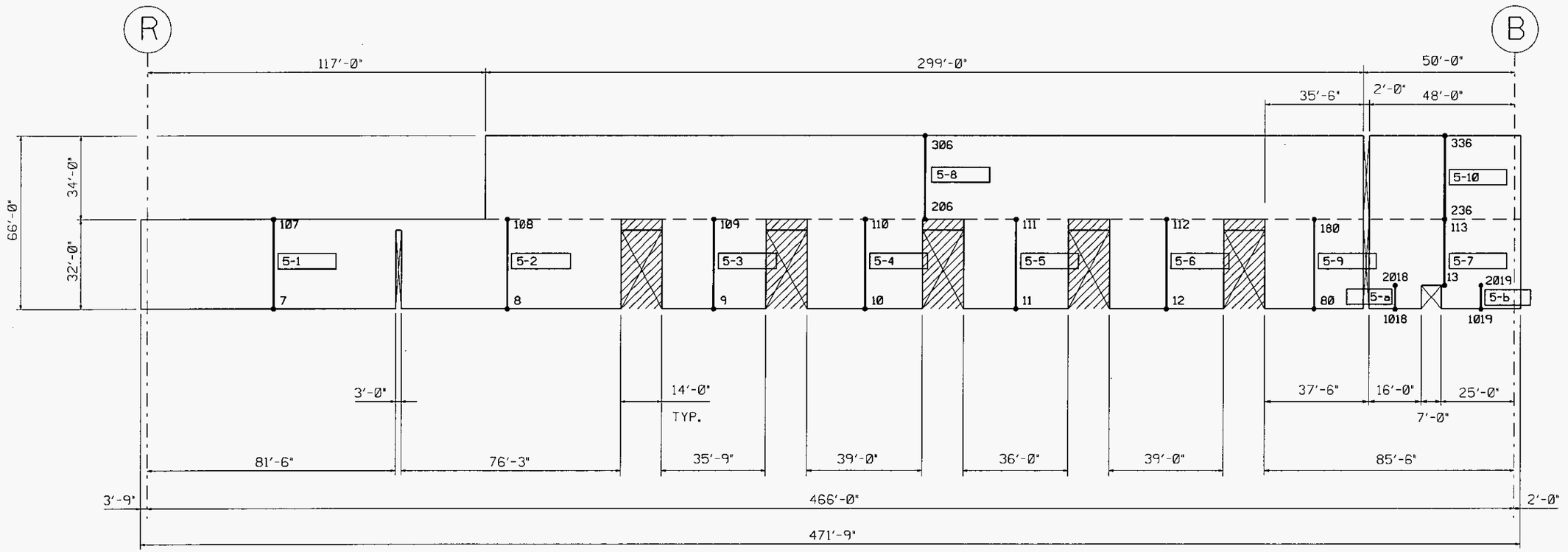
• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 4.5

(Looking West)

N.T.S.

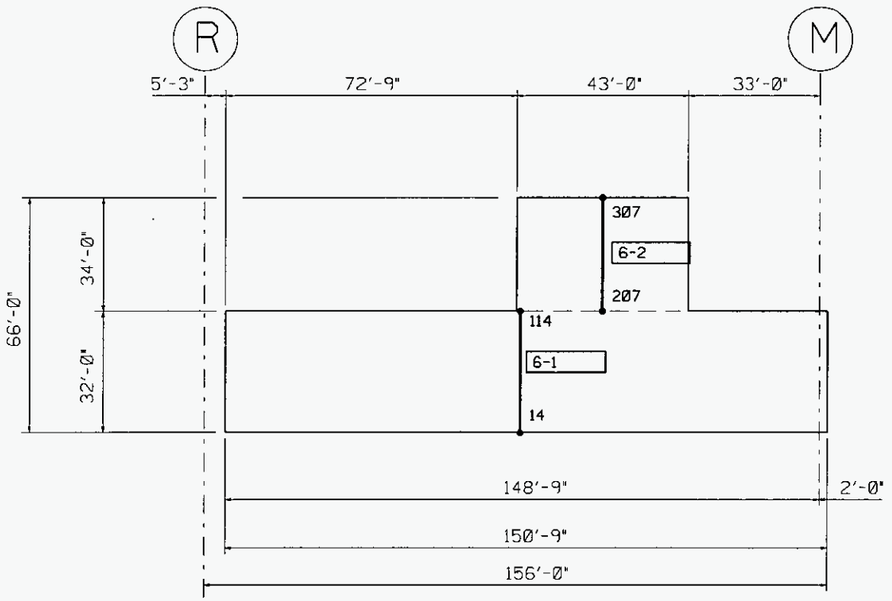


Wall Elevation @ Column Line 5.0

(Looking West)

N.T.S.

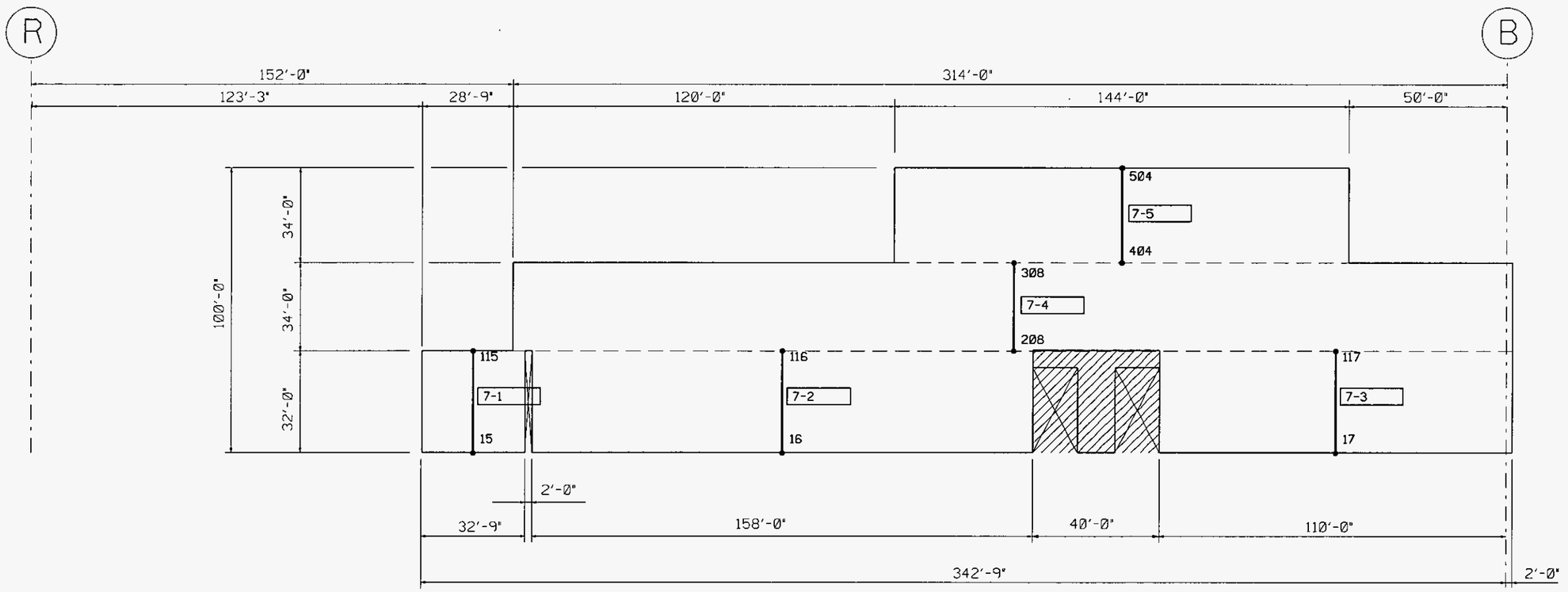
* ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 6.Ø
(Looking West)

N.T.S.

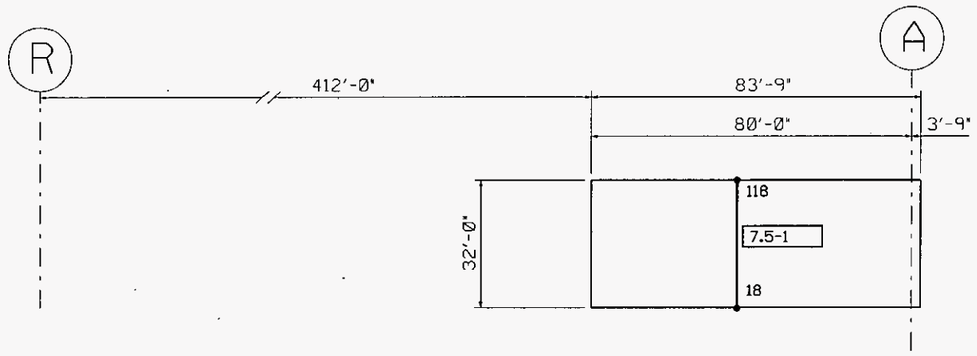
• ALL DIMENSIONS ARE +/- SIX INCHES



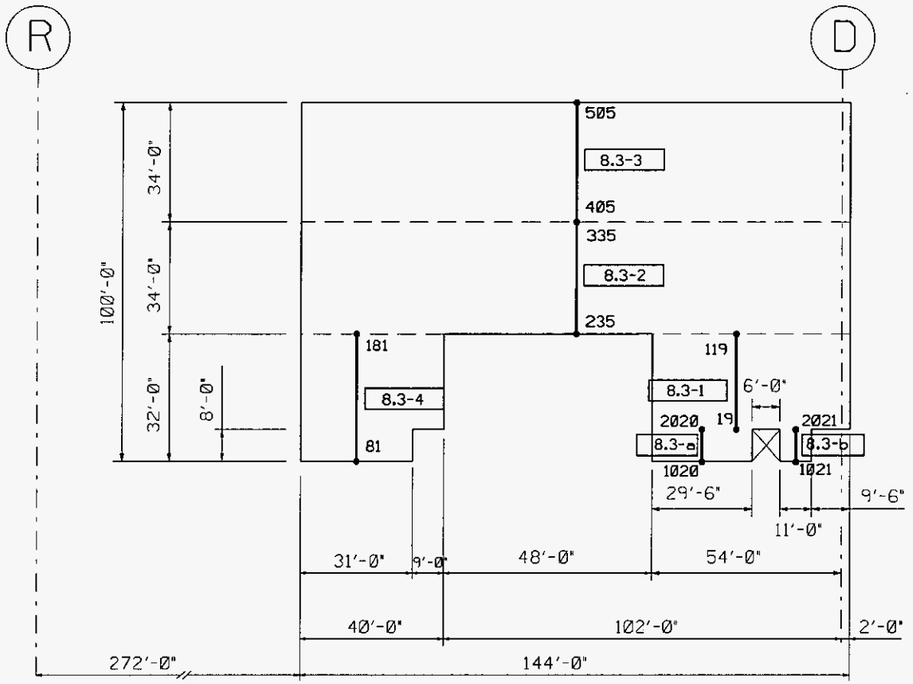
Wall Elevation @ Column Line 7.0
(Looking West)
N.T.S.

Document Identifier: Title:
110-SYC-SY00-00300-000-00A Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES

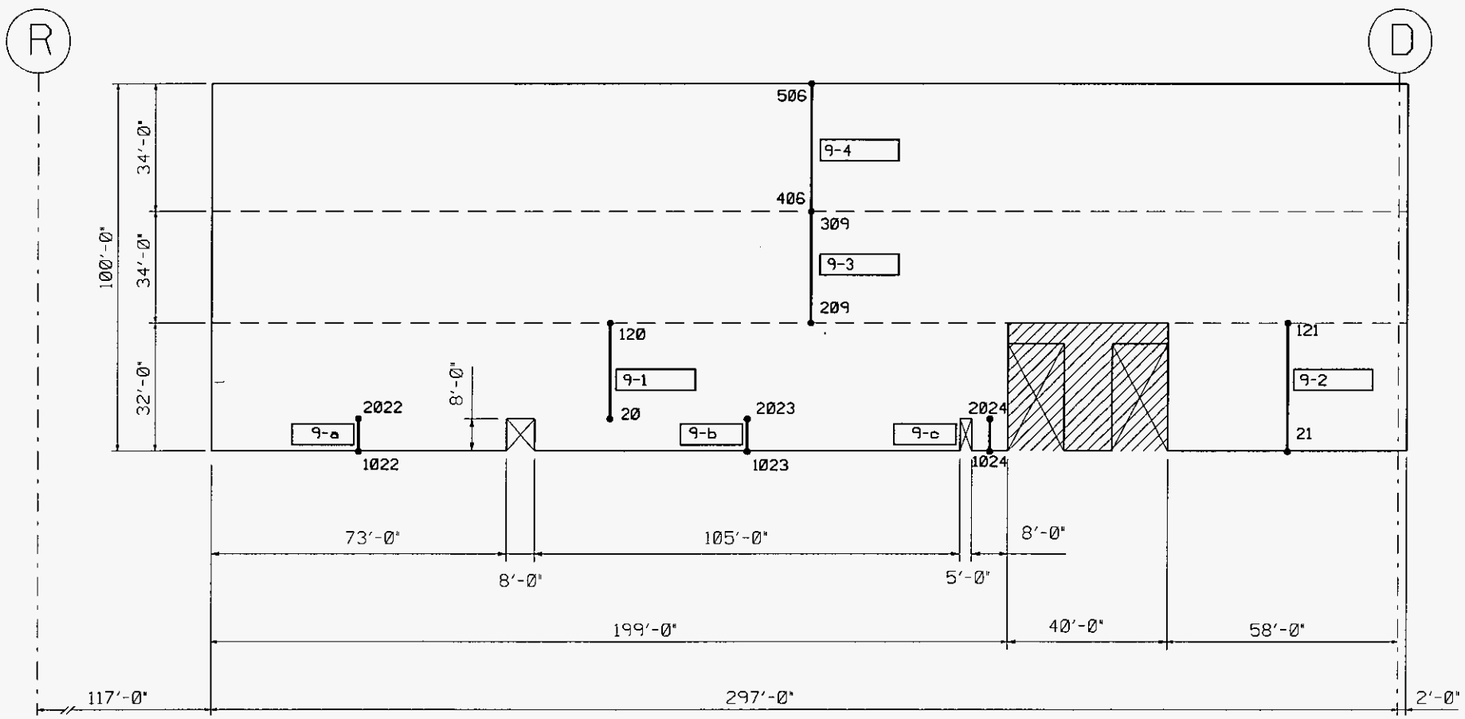


Wall Elevation @ Column Line 7.5
(Looking West)
N.T.S.



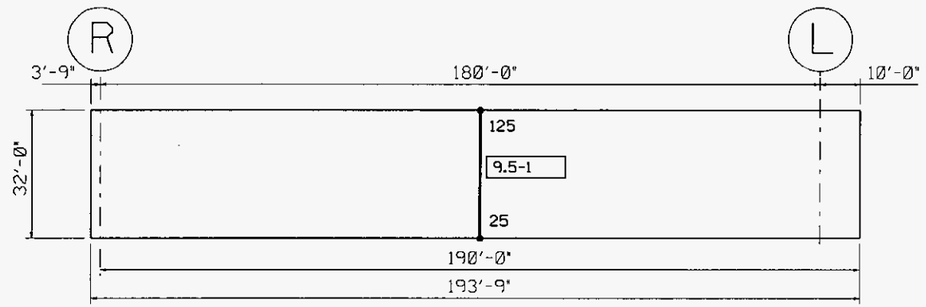
Wall Elevation @ Column Line 8.3
(Looking West)
N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES



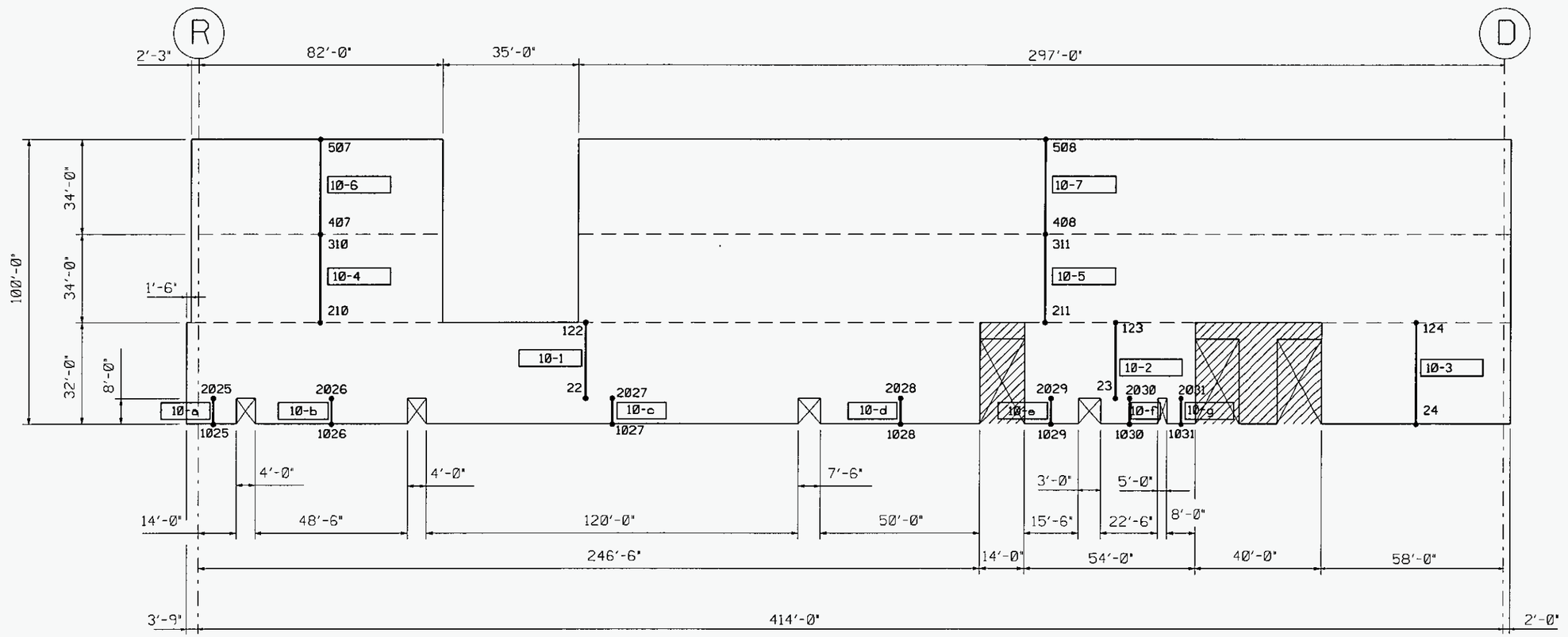
Wall Elevation @ Column Line 9.0
(Looking West)
N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 9.5
(Looking West)
N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

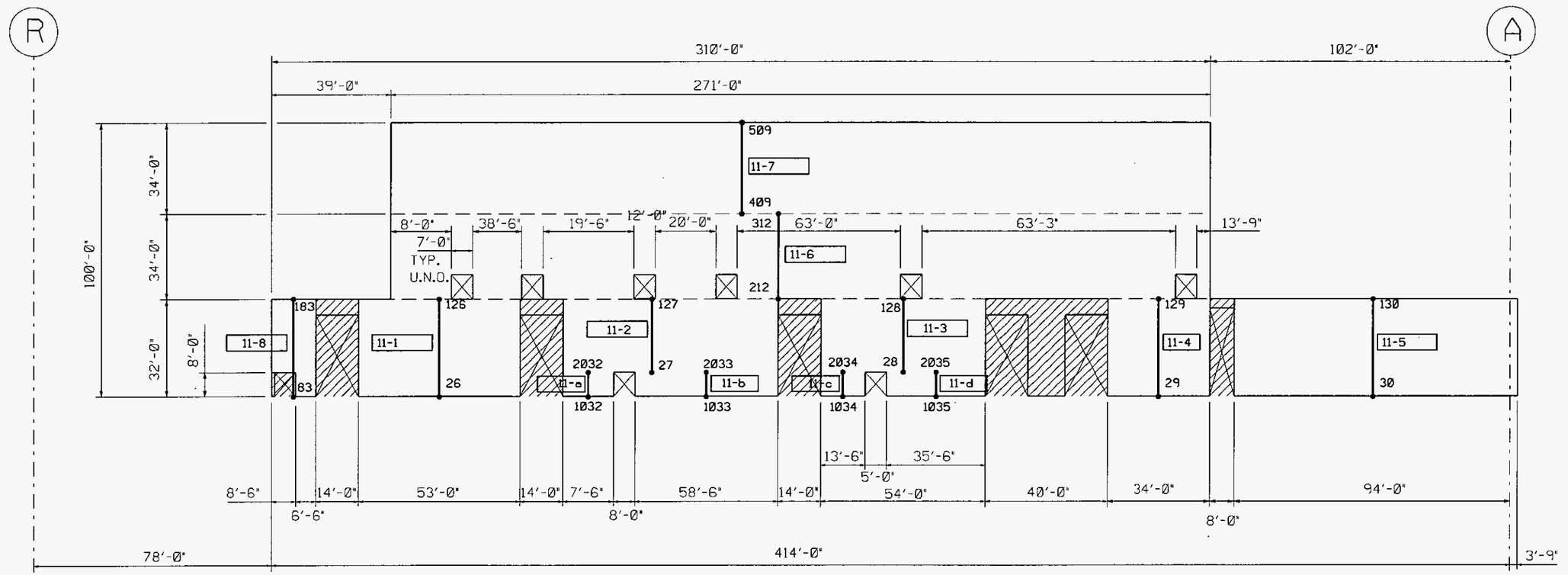


Wall Elevation @ Column Line 10.0

(Looking West)

N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

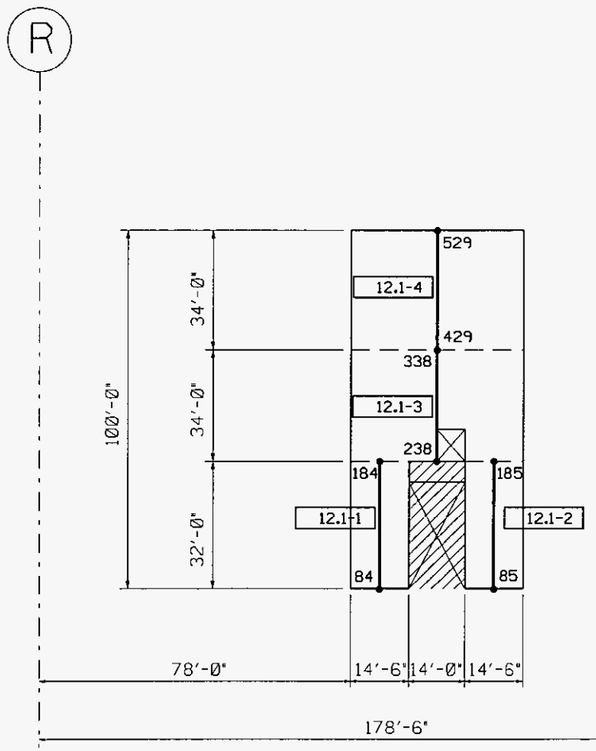


Wall Elevation @ Column Line 11.0

(Looking West)

N.T.S.

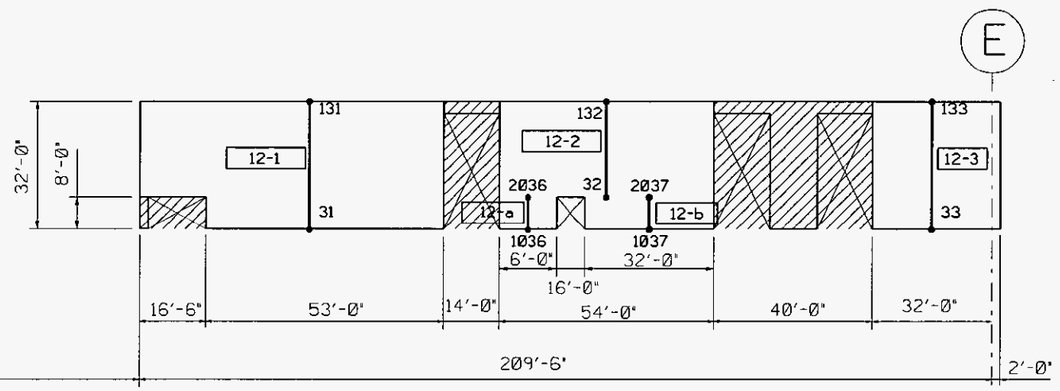
• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 12.1

(Looking West)

N.T.S.

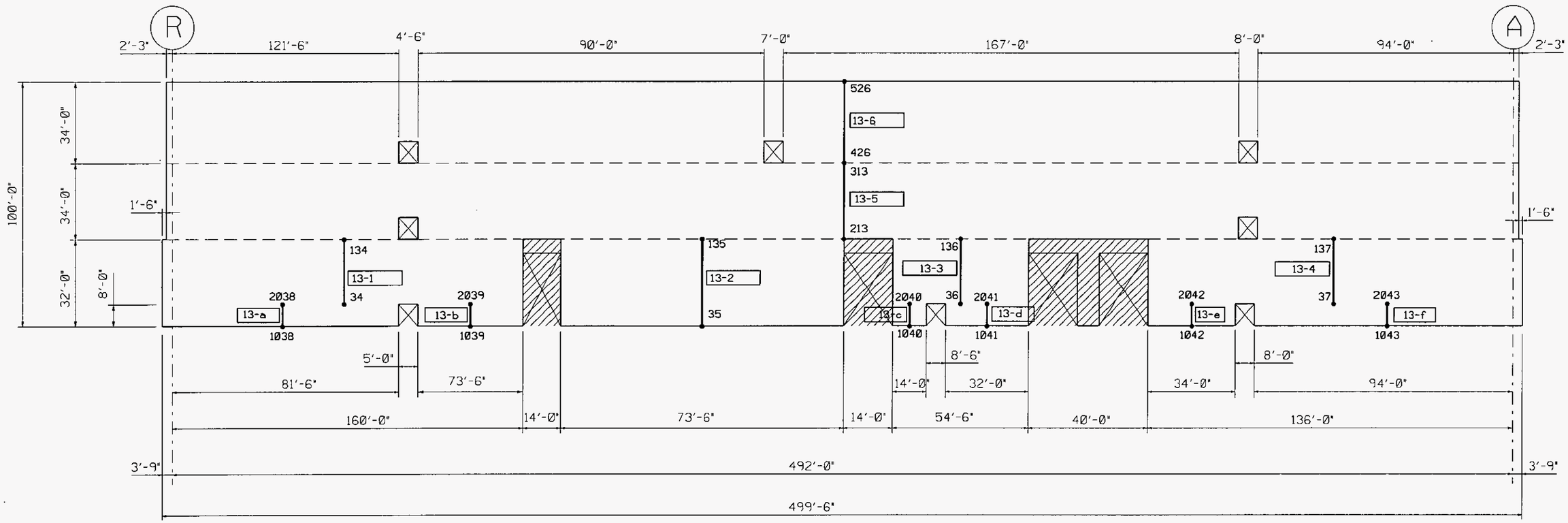


Wall Elevation @ Column Line 12.0

(Looking West)

N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

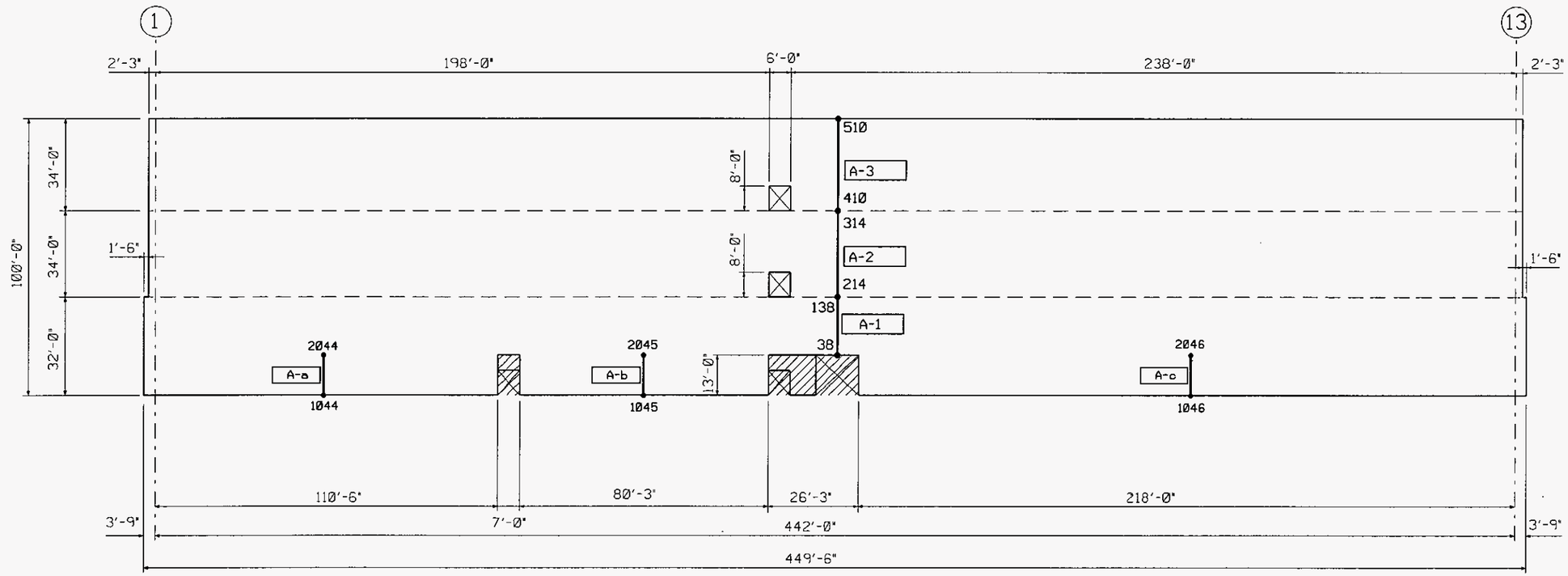


Wall Elevation @ Column Line 13.0

(Looking West)

N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

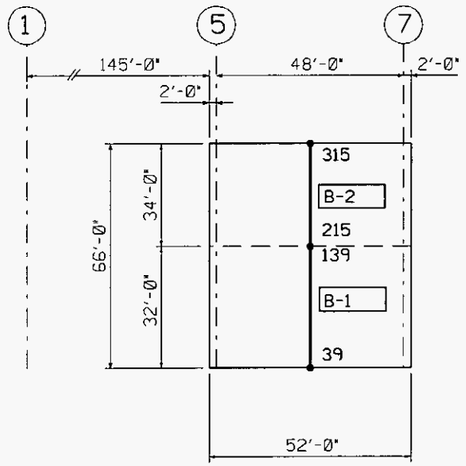


Wall Elevation @ Column Line A.Ø
(Looking North)
N.T.S.

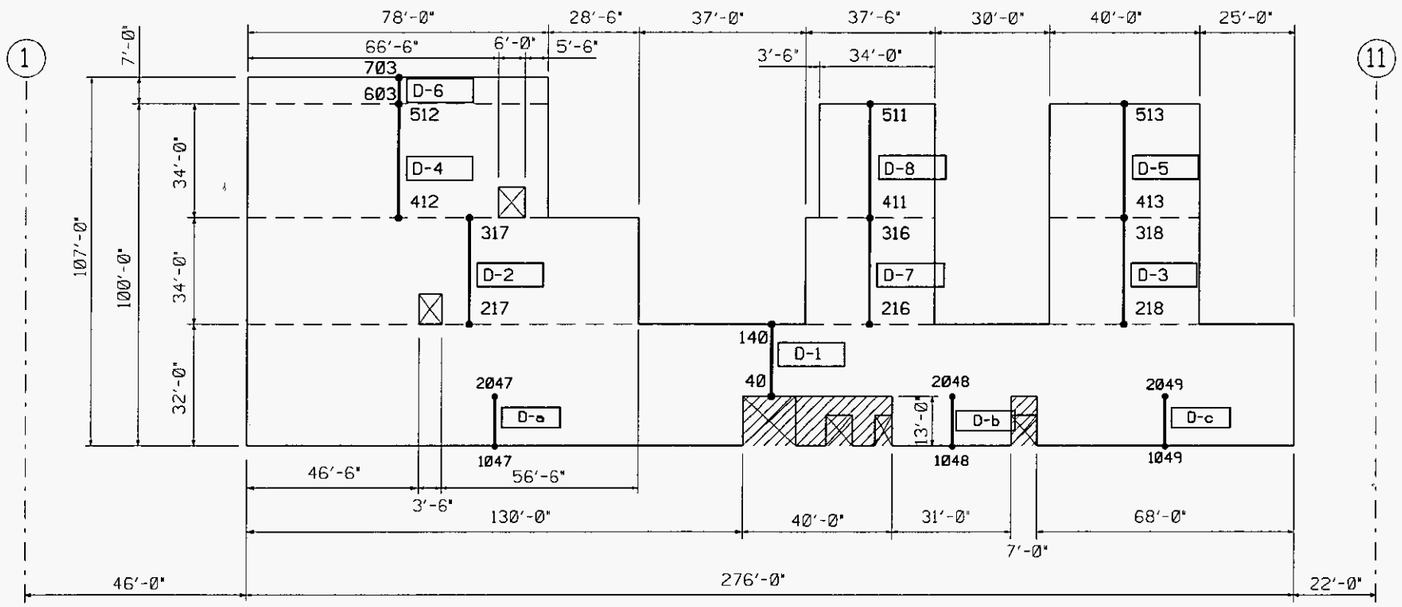
Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES

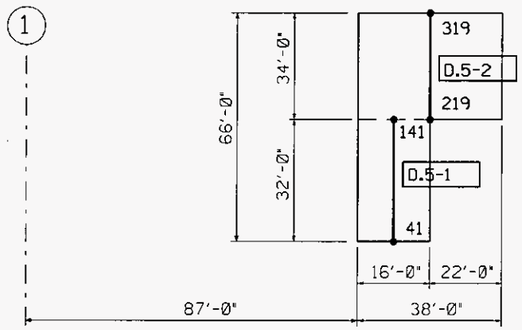


Wall Elevation @ Column Line B.0
(Looking North)
N.T.S.



Wall Elevation @ Column Line D.0
(Looking North)
N.T.S.

• ALL DIMENSIONS ARE +/- SIX INCHES

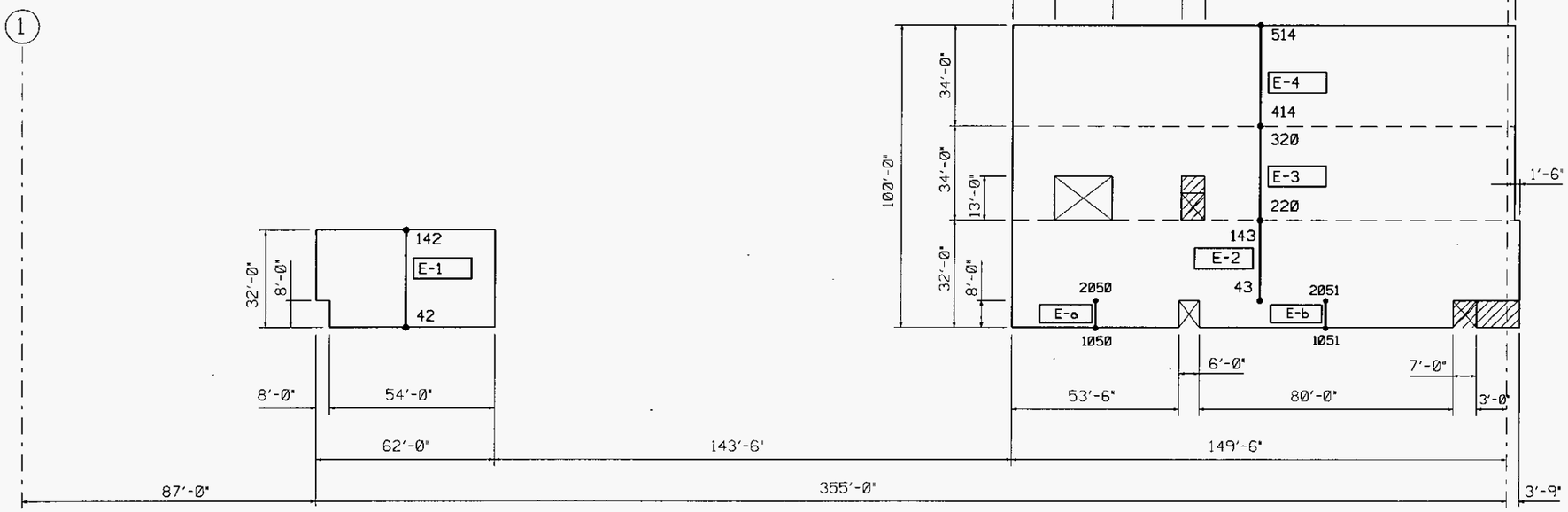


Wall Elevation @ Column Line D.5
(Looking North)
N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

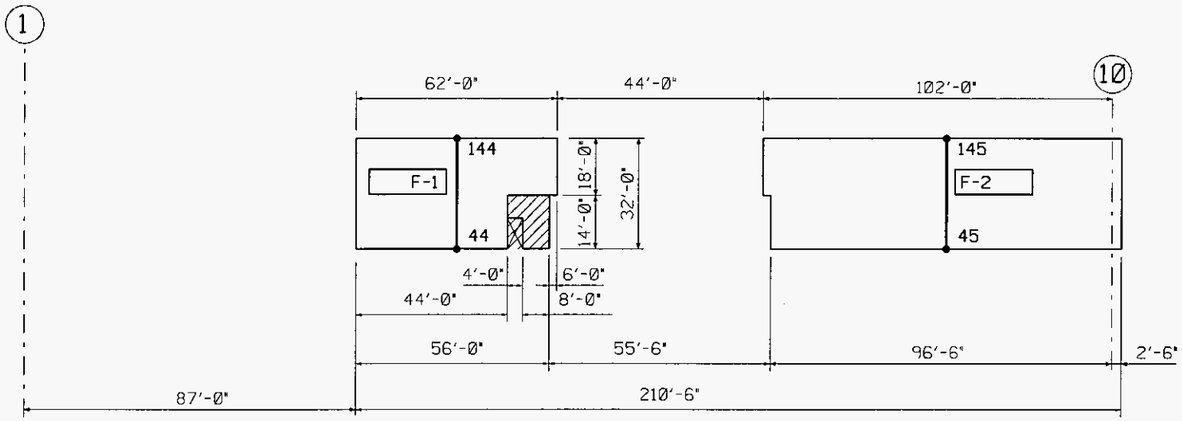
Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line E.0
(Looking North)

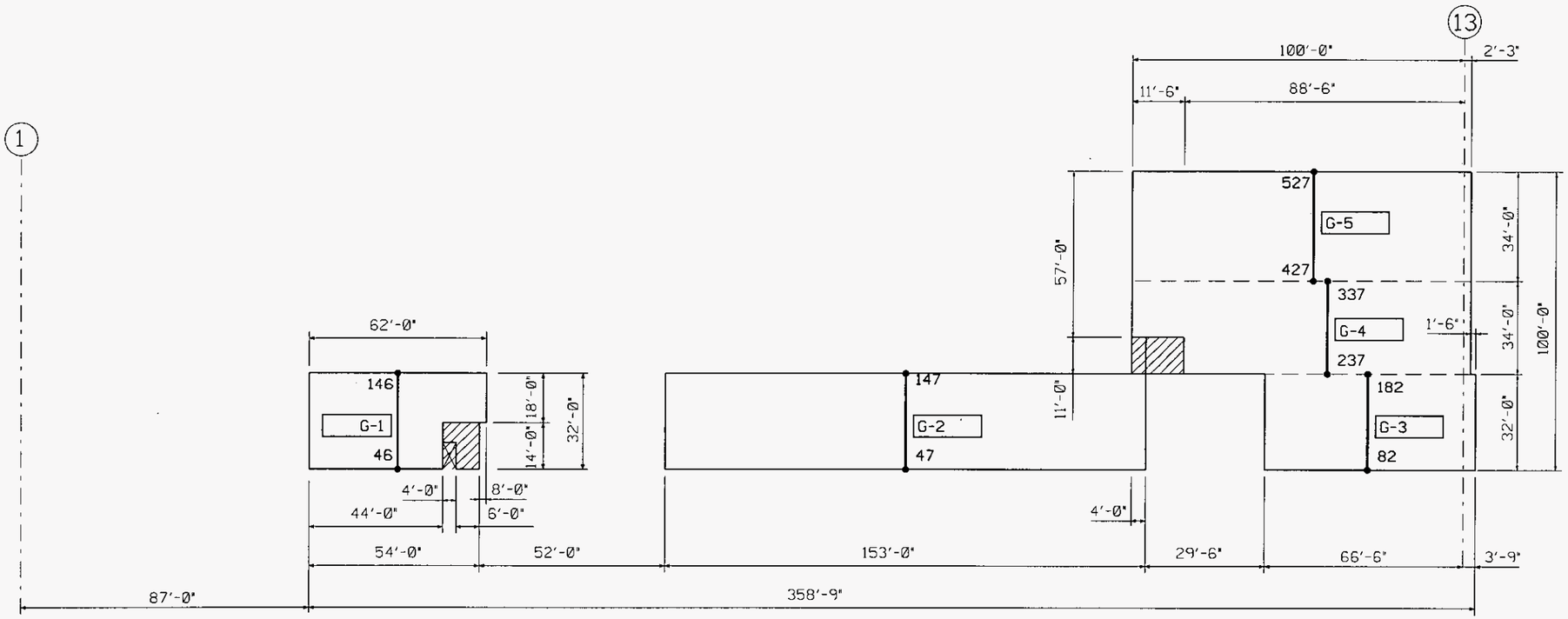
• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line F.Ø

(Looking North)

N.T.S.



Wall Elevation @ Column Line G.0

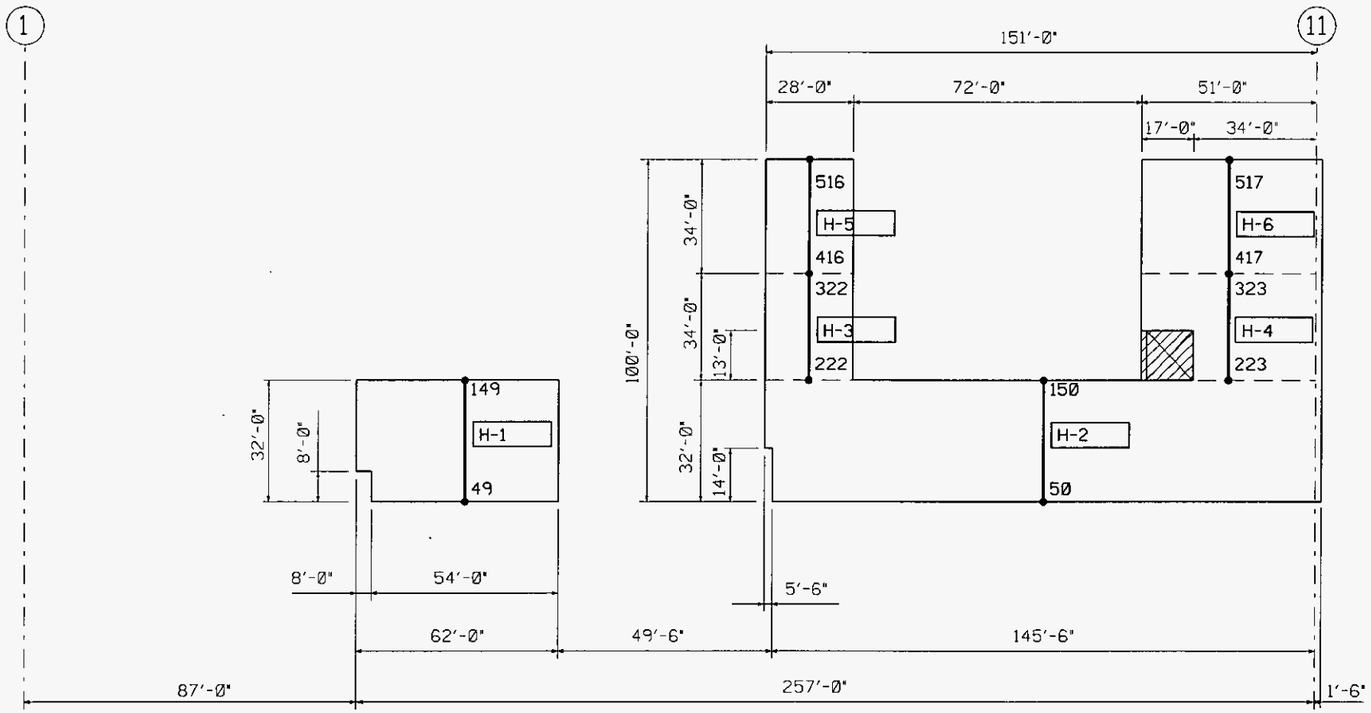
(Looking North)

N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line H.Ø
(Looking North)
N.T.S.

Document Identifier:
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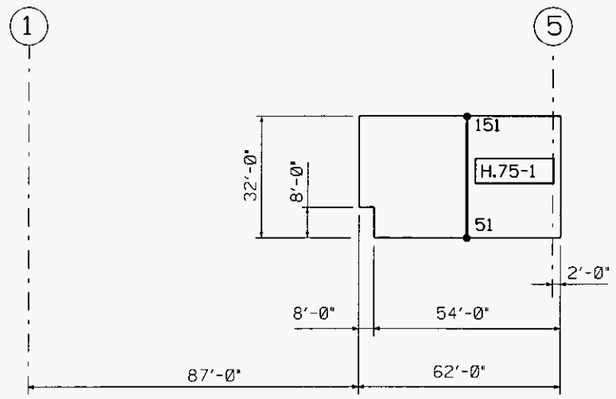
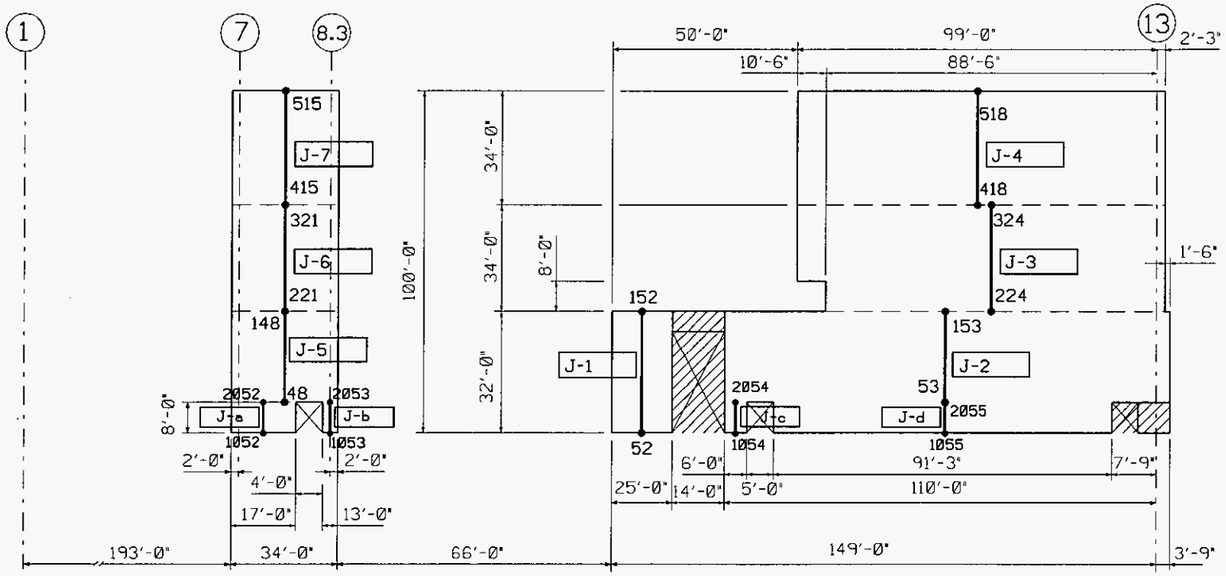
Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line H.75
(Looking North)
N.T.S.

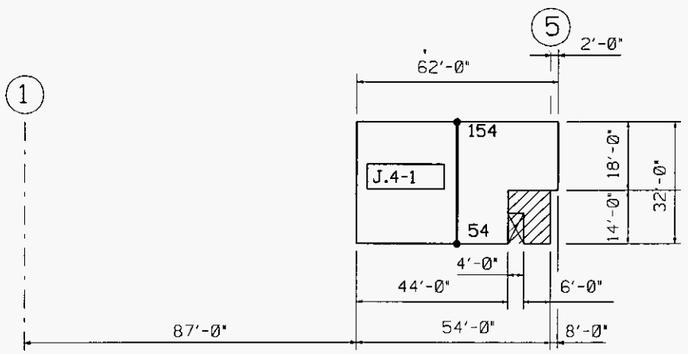


Wall Elevation @ Column Line J.Ø
(Looking North)
N.T.S.

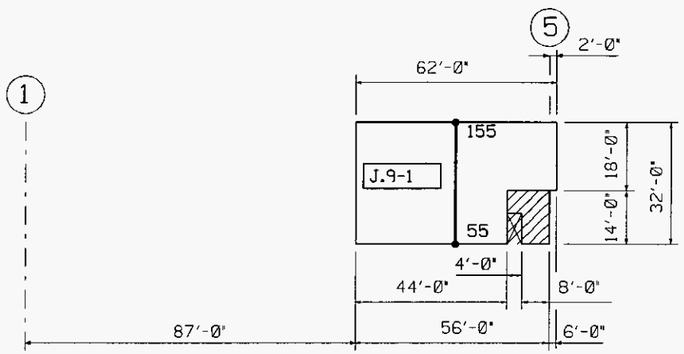
Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line J.4
(Looking North)
N.T.S.

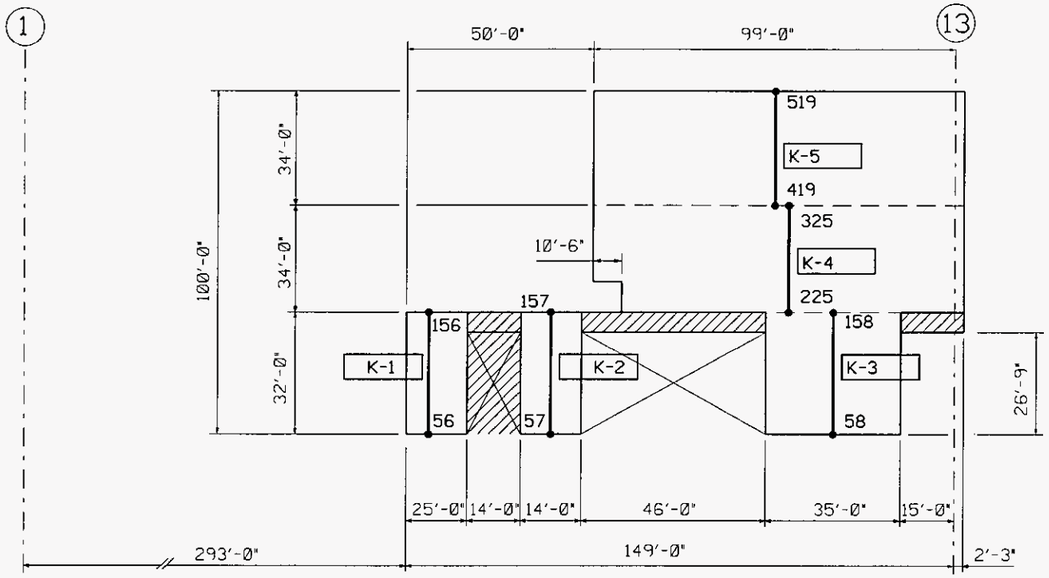


Wall Elevation @ Column Line J.9
(Looking North)
N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES

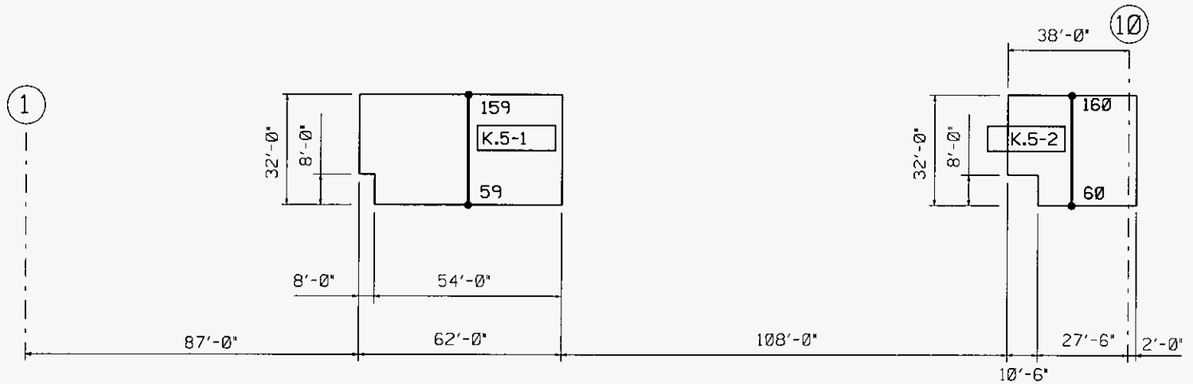


Wall Elevation @ Column Line K.0
(Looking North)
N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line K.5

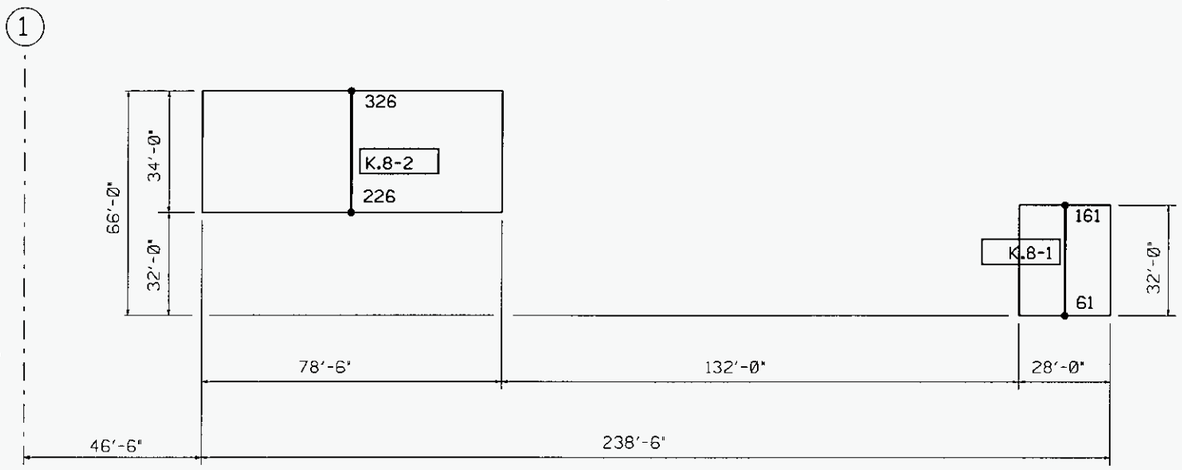
(Looking North)

N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line K.8

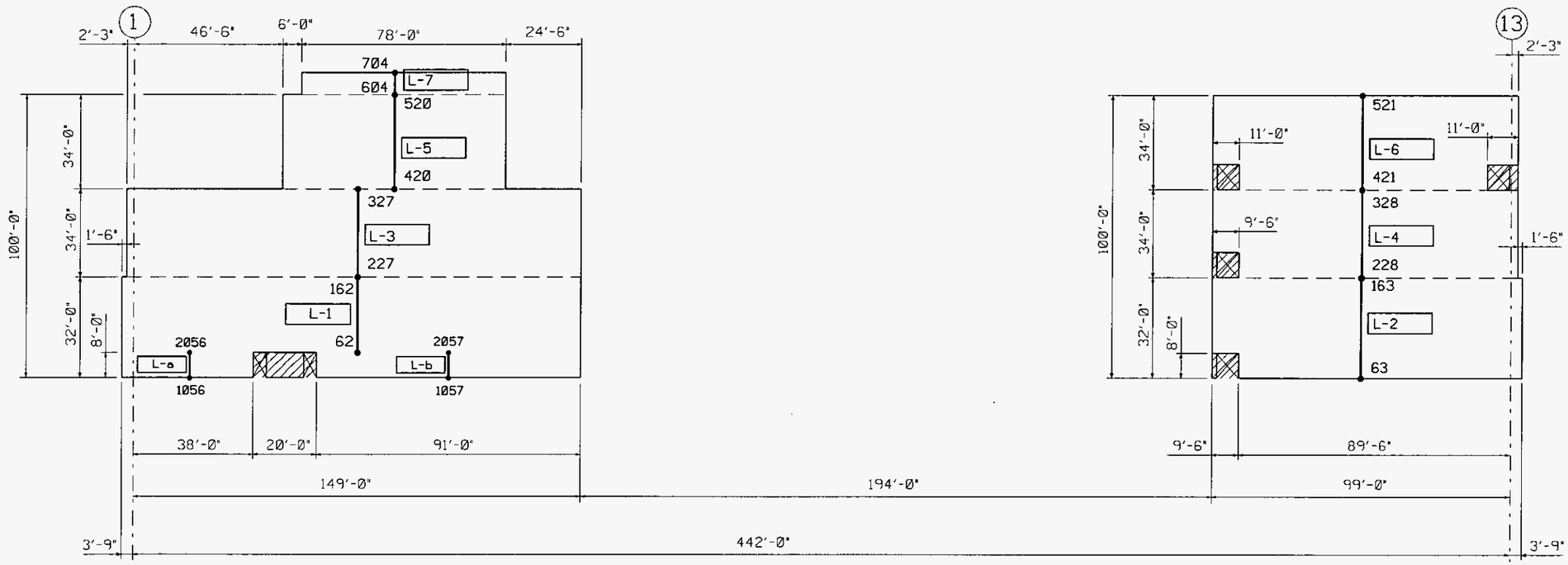
(Looking North)

N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line L.Ø

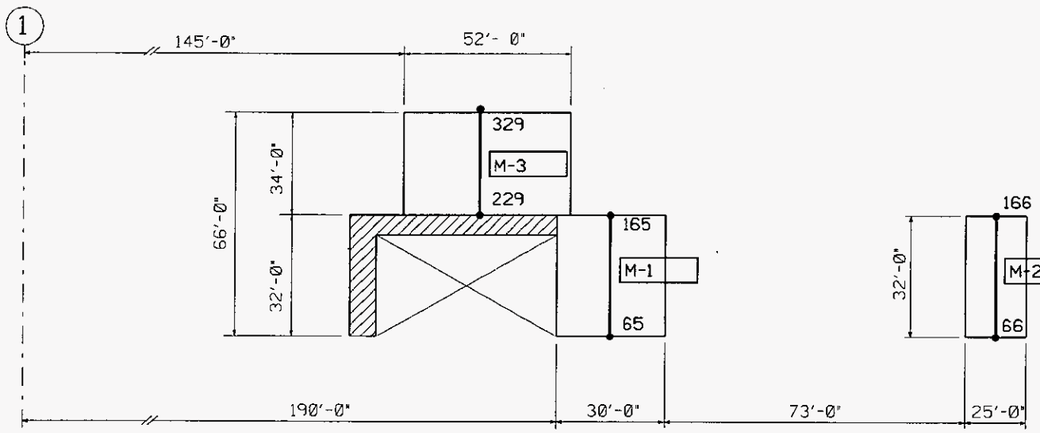
(Looking North)

N.T.S.

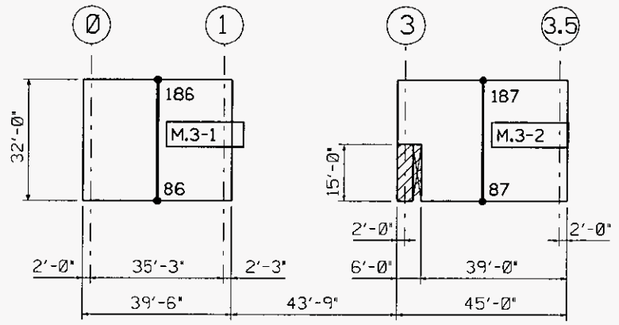
Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line M.Ø
(Looking North)
N.T.S.

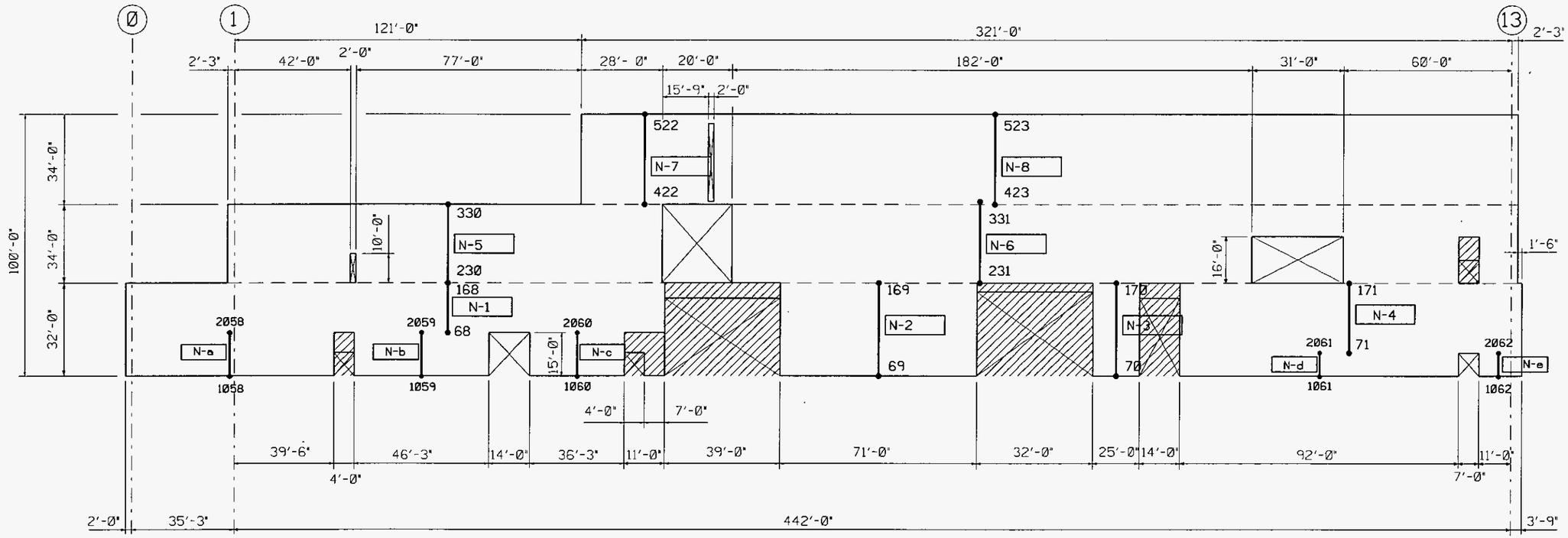


Wall Elevation @ Column Line M.3
(Looking North)
N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES

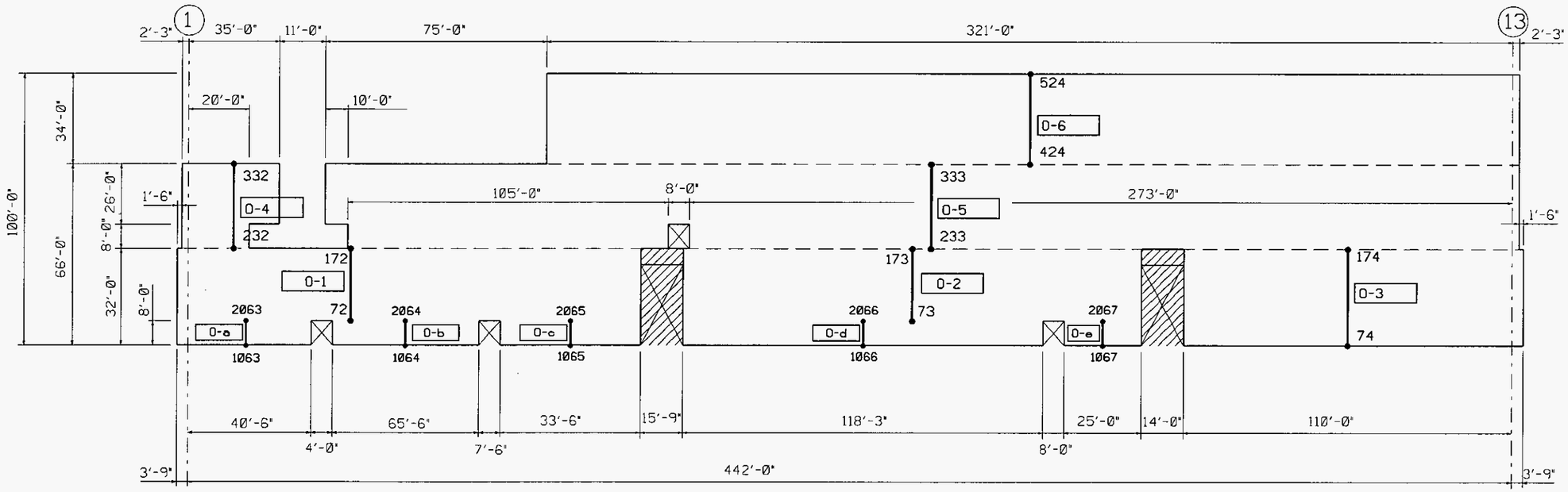


Wall Elevation @ Column Line N.Ø
(Looking North)
N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

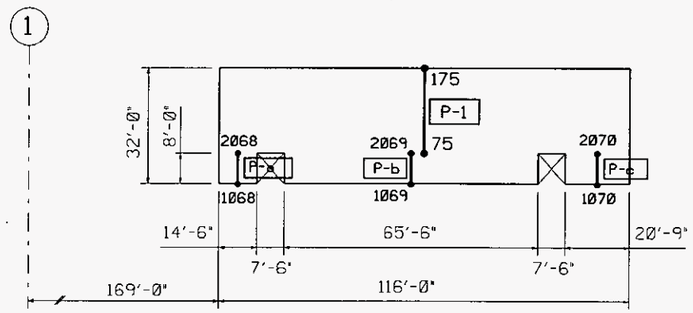
Title:
Dry Transfer Facility Seismic Analysis

• ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line 0.0
(Looking North)
N.T.S.

* ALL DIMENSIONS ARE +/- SIX INCHES



Wall Elevation @ Column Line P.Ø

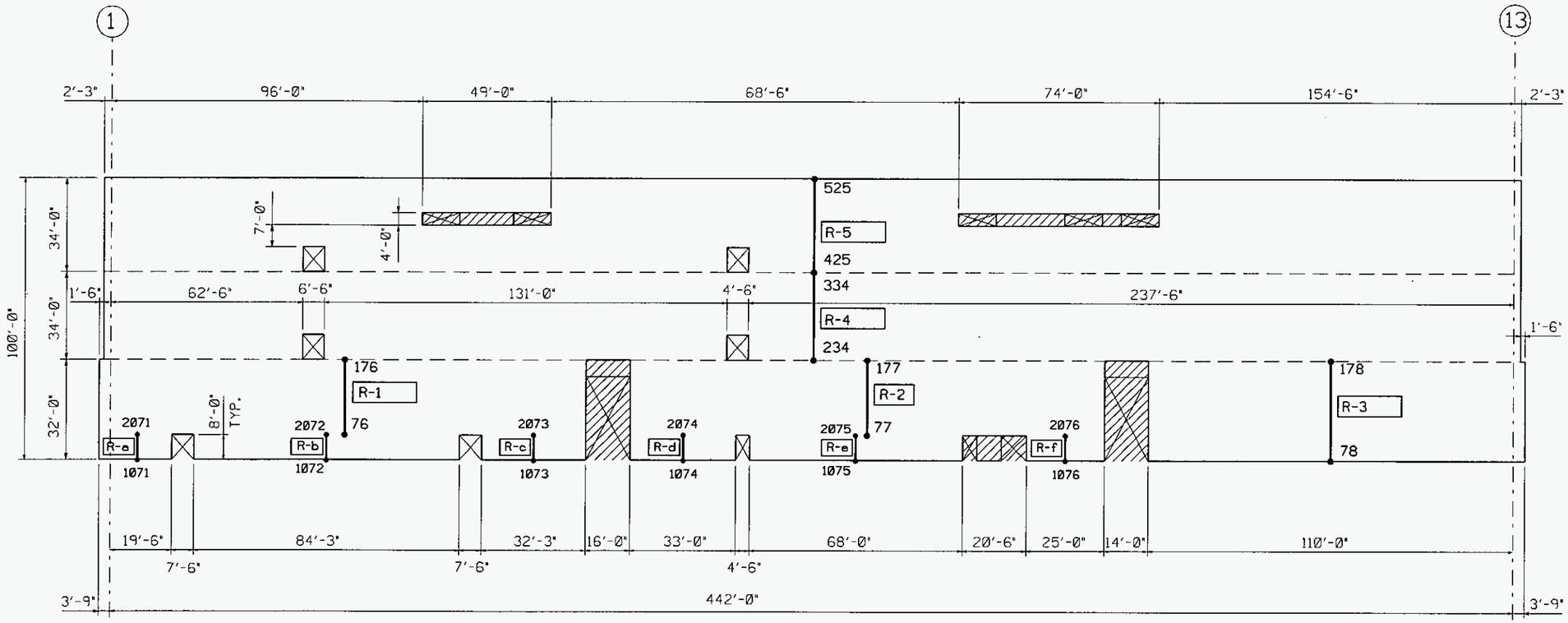
(Looking North)

N.T.S.

Document Identifier:
110-SYC-SY00-00300-000-00A

Title:
Dry Transfer Facility Seismic Analysis

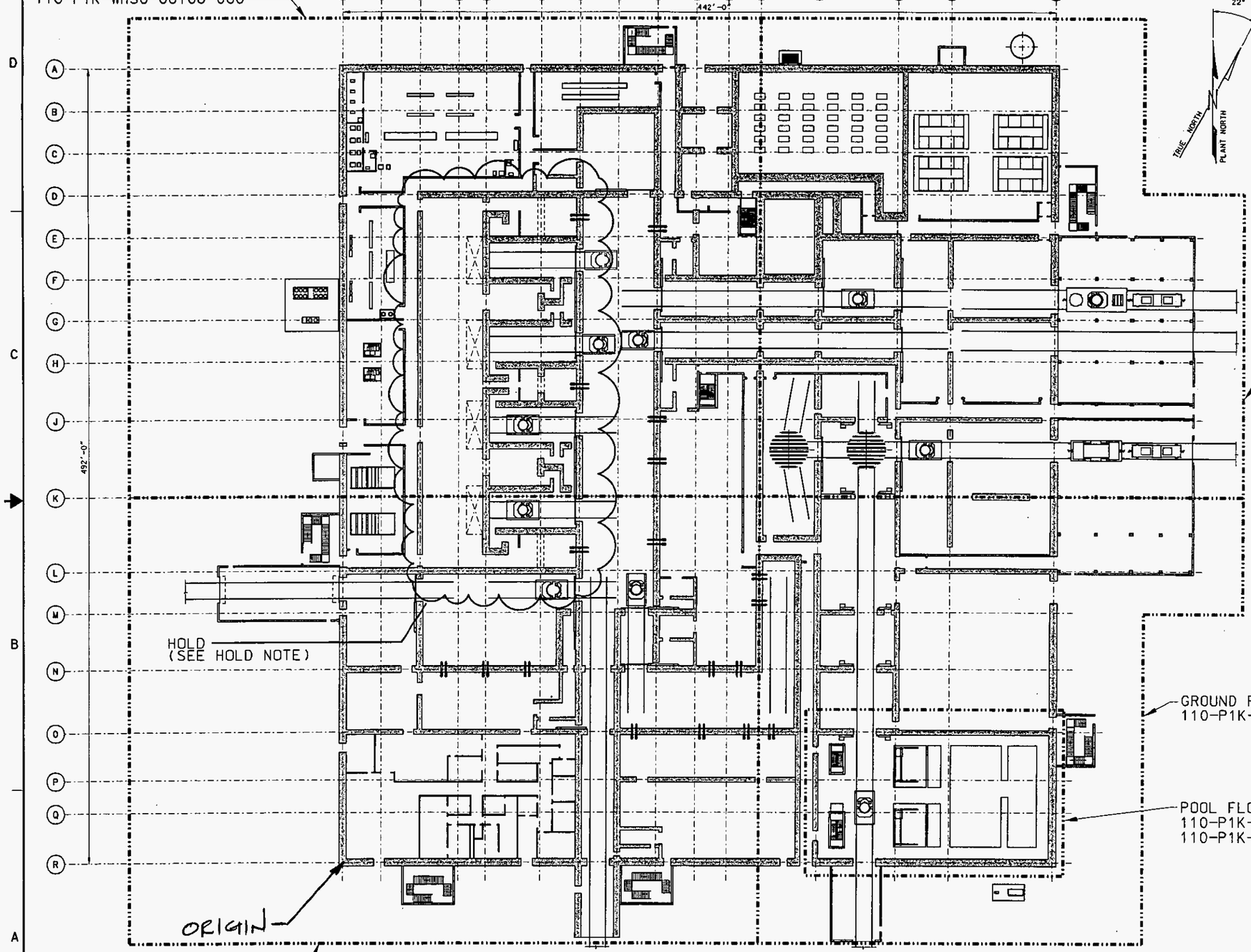
• ALL DIMENSIONS ARE +/- SIX INCHES

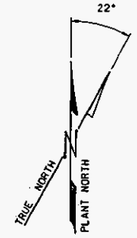


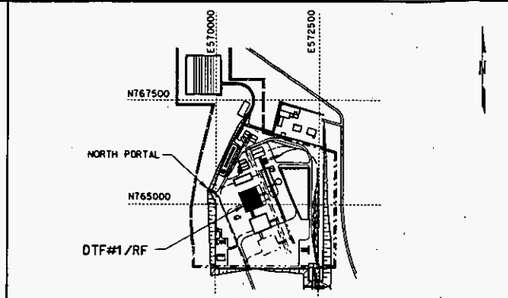
Wall Elevation @ Column Line R.Ø
(Looking North)
N.T.S.

- ATTACHMENT 9, SHT. 1 OF 1

GROUND FLOOR PLAN A
110-P1K-WHS0-00108-000







KEY PLAN
FOR REFERENCE ONLY

NOTES:
1. FOR DRAWING INDEX, LEGEND & GENERAL NOTES SEE 110-P1K-WHS0-00101-000.
2. ALL PERIMETER CONCRETE WALLS ARE 4'-6" THICK. ALL INTERIOR CONCRETE WALLS ARE 4'-0" UNLESS NOTED OTHERWISE (UNO).

DI: 110-SYC-SY00-00300-000-00A
TITLE: DRY TRANSFER FACILITY SEISMIC ANALYSIS

GROUND FLOOR PLAN B
110-P1K-WHS0-00109-000

HOLD NOTE
1. ON HOLD FOR RESOLUTION FOR INNEL QA ISSUE

GROUND FLOOR PLAN D
110-P1K-WHS0-00111-000

POOL FLOOR PLANS
110-P1K-WHS0-00111-000
110-P1K-WHS0-00124-000

GROUND FLOOR PLAN C
110-P1K-WHS0-00110-000

GROUND FLOOR PLAN AT EL +0'-0" (UNO)

GRAPHIC SCALE
0 30 60 90 FEET
1" = 30'

THIS DRAWING IS PRELIMINARY AND NOT INTENDED FOR CONSTRUCTION, PROCUREMENT OR FABRICATION.

REV	DESCRIPTION	DATE	ORIG	CHK	VER	DLC	DER	PE
00B	WP CLOSURE CELL AREA ON HOLD	1/23/04	FB	TS			FB	
00A	ISSUED FOR DESIGN DEVELOPMENT	12-16-03	WG	TS			FB	JA

APPROVALS	INITIAL/DATE
DRAWN BY FB FOR W GUE	FB 1/23/04
ORIGINATOR T SAUER	TS 1/23/04
CHECKER	
VERIFICATION	
DESIGN LEAD ENGINEER F BASAMANOWICZ	FB 1/23/04
QUALITY ENGINEERING REP	
PROJECT ENGINEER C. HOVITT / J. ANDERSEN	FB 1/23/04

U.S. DEPARTMENT OF ENERGY
Office of Repository Development (ORD)
BECHTEL SAIC COMPANY, LLC Management and Operation of the Office of Civilian Radioactive Waste Management Program

DRY TRANSFER FACILITY #1
/REMEDIATION FACILITY
GENERAL ARRANGEMENT
GROUND FLOOR KEY PLAN

SIZE	SCALE	DOCUMENT IDENTIFIER	REV
D	1"=30'-0"	110-P1K-WHS0-00102-000-008	

SAFETY CATEGORY	CAD FILENAME	SHEET
N/A	110pla0102.dgn	2

CADD CODE: ARCH D - 24"x36"
RECORD DESIGNATOR QA: N/A

solidworks I:\USERS\12-16-03\110pla0102.dgn